Quantum™ 3080 Surgical Table

TECHNICAL MAINTENANCE MANUAL

(6/30/95) **764322-670**
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The following are personnel (WARNINGS) and equipment (CAUTIONS) safety precautions to be observed when operating or servicing this table. This is a listing of all safety precautions appearing in the text. Carefully read them before proceeding to use or service the table. Observance of these safety precautions will minimize the risk of personal injury or the possible use of improper maintenance methods which may damage the table or render it unsafe. It is important to understand that these precautions are not exhaustive. STERIS could not possibly know, evaluate and advise maintenance departments of all conceivable ways in which maintenance might be done or the possible hazardous consequences of each way.

The operation and maintenance procedures recommended by STERIS are described in this manual. Only these recommended maintenance procedures should be followed.

⚠ WARNING!

- **TRIPPING HAZARD** – Route power cord to wall receptacle so that it will not be tripped over by personnel in the area.
- **PATIENT INJURY HAZARD** – The following warnings must be observed when operating this table:
  - » **PINCHING HAZARD** – Pinch points are created during extreme tabletop articulation. Carefully review Figure 3-1 before operating the table.
  - » **TIPPING HAZARD –** Do not use table unless floor locks are engaged.
  - » **TIPPING HAZARD** – Do not release floor locks while patient is on table.
  - » **TIPPING HAZARD –** 400 pounds is the maximum safe patient weight on this table for the standard surgical positions. Do not use this table for patients exceeding the 400-pound limit. Contact your local STERIS representative for maximum safe patient weight for any position other than those shown in this publication.
  - » **TIPPING HAZARD –** Obese patients may cause tipping if reversed on this table.
  - » **TIPPING HAZARD –** Possible patient injury and table failure may result from using this table for patient positions other than those shown. Contact your local STERIS representative with respect to positions not shown in this publication.
  - » **FIRE HAZARD –** Table is not to be used in the presence of flammable anesthetics.
- **PERSONAL INJURY HAZARD –** Health care professionals must ensure that patients are positioned and monitored so as to prevent compromising respiration, nerve pathways or circulation.
- **PERSONAL INJURY HAZARD –** When installing any table accessory, check for correct attachment and tighten securely (if appropriate). Do not use worn or damaged accessory. Check installation before using any accessory.
- **PERSONAL INJURY HAZARD –** Unanticipated table movement could cause patient injury. Patient must be secured to the table in accordance with recommended positioning practices.

⚠ WARNING! (cont'd)

- **PERSONAL INJURY HAZARD** – Do not immerse any part of foot control in liquids; this could cause unanticipated table movement, leading to patient injury. Always cover control with a plastic bag before using.
- **INSTABILITY HAZARD** – Possible patient or user injury, as well as table or accessory failure, may result from using STERIS table accessories for other than their stated purpose. . .or from using, on STERIS tables, accessories manufactured and sold by other companies.
- **TIPPING HAZARD** – Foot Extension accessory or combination Foot Extension and Headrest accessories from previous design STERIS tables should not be used for REVERSE orientation on 3080 tables, as they will create a tipping hazard.
- **TIPPING HAZARD** – Two or more Uro-Endo/Image Amplification Extension Accessories must not be used together on 3080 table.
- **TIPPING HAZARD** – During an articulation if the table top sections contact an obstruction, the table may tip. Before lowering either the table top or individual sections, remove possible obstructions. Do not allow leg section, when lowered, to contact the floor.
- **INSTABILITY HAZARD** – Stabilize table when transferring patient.
- **INSTABILITY HAZARD** – Leg Transfer Support Accessory must be used only as a leg support; it is not intended to support upper body weight of a patient.
- **TABLE FAILURE HAZARD** – The safe and reliable operation of this equipment requires regularly scheduled preventive maintenance in addition to the faithful performance of the routine maintenance described in this section. Repairs and adjustments must be performed only by experienced personnel, fully acquainted with this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage.
- **INFECTION HAZARD** – Rubber or plastic gloves, masks and eye protection must be worn when cleaning to protect against aerosols being reflected from contaminated surfaces.
- **EXPLOSION HAZARD –** Electrically conductive properties of casters and floor locks must be monitored. Before placing table in use, measure their resistance level according to the requirements of NFPA 99. Perform subsequent routine testing at least once a month.
- **INJURY HAZARD –** Pinch point areas exist between top sections and saddle casting. Keep hands clear while moving top and turn table off during adjustments.
- **PINCHING AND TIPPING HAZARD** – Patient injury may result if the operator of this table is not completely familiar with the controls for patient positioning and table operation.
- **SHOCK HAZARD –** Before proceeding, disconnect all power sources, i.e., wall plug, control battery and (if a battery-operated table) the motor battery positive terminal.

⚠ WARNING! (cont'd)

- **CRUSHING HAZARD** – Counterweight weighs approximately 90 lbs. Grip tightly . . . do not drop on table base or toes or fingers.
- **ELECTRIC SHOCK HAZARD**–P25 may arc as connections are made, to initially charge power supply capacitor C30.
- **TABLE FAILURE HAZARD**–Breaking hydraulic fittings will cause associated table section to fall and excessive amounts of fluid may flow from fitting.

⚠ CAUTION!

- To avoid damage to hand-control cord (and optional foot-control cord) make sure they are clear of any table pinch points.
- To avoid possible damage to hand control, hang it from side rail (or end rail) of table when not in use.
- Static electricity can damage microprocessor controls. Indiscriminate probing of circuits or improper connections may result in immediate or delayed electrical failure. If the electronics are to be accessed, use a personal grounding device. Exercise care in all activities involving the electronic circuitry.
- Isolate the coil and/or pump motor from the control by disconnecting the wires on the motor terminal board, or slip the wires off the solenoid coil.
- Use only recommended cleaners/disinfectants on STERIS tables. Do not use phenolics which may cause patient skin burns if inadequately rinsed off, or alcohol which does not have sufficient cleaning/disinfecting properties.
- Cleaning procedures requiring table articulation should be performed only by persons familiar with table operation.
- Read the label of aerosol can thoroughly and follow all directions and cautions as shown.
- Do not spray cleaning fluid into electric receptacles and avoid spraying directly on override switches or into clearance space above column. Spray or drippage may settle onto electric circuits inside table causing corrosion and loss of function.
- Always connect power cord to a properly grounded socket.
- To prevent rubber bumpers from being cut off, replace base shroud pieces carefully and evenly.
- When removing raise/lower cartridges it is important to support the raise/lower mechanism.
- Do not use cloth to wipe inside of valve manifold.
- Be careful not to damage o-rings and/or cartridge bodies during re-assembly.
- When reinstalling power supply assembly, be aware of table-lock microswitch wires (blue twisted pair wire numbers 80 and 81; #109, Fig. 9-24B). Handle carefully to avoid breaking solder connections.
- Handle wire cables carefully, making sure they don't become hung up in other components, and that wires don't pull out of plugs.

⚠ CAUTION! (cont'd)

- Take care when removing and installing cylinders. Make sure cylinder rods remain clean and undamaged. Nicks and/or scratches will eventually cause leakage.
- Do not remove back section cylinder without supporting back section. Limit switch will be damaged if back section drops too much.
- Disconnect table from any external AC power source before performing this procedure (resetting voltage switches).
- Before articulating or making any adjustments to the table, be certain that no electrical or hydraulic hoses are subjected to stress or pinching.
- Tilt articulation must be activated while adjusting the cylinder rod to release the brake mechanism. Failure to do this will destroy the cylinder.
- Retaining washer and spring may quickly expel from the valve block.
- Plunger is equipped with a spring which may expel from the housing upon removal of the plunger housing.
- Failing to secure section will result in sudden lowering of that section.
- Before removing the screws entirely, be sure to grasp the lower part of the manifold.
- During some extreme articulations, the table top may contact the base and/or column shrouds. Take care to avoid positioning the table in such a way as to cause damage to the shrouds.
- After performing cleaning procedures, insure pads and x-ray tops are completely dry before reinstalling. Moisture trapped between pads and x-ray tops may contribute to equipment damage, such as x-ray top warpage.

IMPORTANT: If table has been stored for longer than four weeks, operate table through all articulations prior to usage.

GENERAL

The product literature included in this section contains factual data relating to the principal descriptive and identifying characteristics of particulars for Quantum 3080 major surgical tables. The literature is informational rather than instructional. It provides and conveys, textually and illustratively, a general concept of the equipment, its purpose, capabilities, limitations and technical specifications.

SPECIAL TOOLS/ MATERIALS

Table 2-1 shows the tools and kits necessary to repair and maintain the Quantum 3080 table. It is important that these tools be on hand before any maintenance procedures are started. Because of the special nature of the table's hydraulic system, keeping the hydraulic hoses and cylinders clean and dust-free is very important.

FEATURE BENEFITS

New return-to-level capability eliminates guesswork and time normally involved in returning the patient to level.

New Akros pads provide a unique pressure management system for the prevention of decubitus ulcers.

One-year warranty confirms STERIS's commitment to quality and responsiveness.

The four-section, radiolucent 75" tabletop has been lengthened to accommodate taller patients with maximum table articulations and complete upper and lower body I.A. coverage.

Table 2-1
Special Tools for 3080 Table Maintenance

Part Number	Tool	Quantity
P-764322-660	Kit, Tool 3080 (04)	1
P-764322-738	• Pressure Gauge, 0-2000 PSI	1
P-764322-739	• 9/16" Deep Socket, 14" Drive	1
P-764322-740	• 7/8" Deep Socket, 1/2" Drive	1
P-764322-743	• 1/2" 70° Offset Open-end Wrench	1
P-764322-744	• 9/16" 70° Offset Open-end Wrench	1
P-764322-745	• 5/8" 70° Offset Open-end Wrench	1
P-764322-746	• 1-1/16" 70° Offset Open-end Wrench	1
P-764322-747	• Protractor	1
P-764322-748	• Hex Head Plug, SAE	1
P-764322-749	• O-ring (1/2" OD x 3/8" ID)	2
P-764322-750	• Cap, FNL	4
P-764322-751	• Plug, FNL	2
P-764322-752	• O-ring (7/16" OD x 5/16" ID)	3
P-90696-061	• Screw, Hex Sockethead, #10-32 x 1-3/4	1
P-764322-952	Allen Wrench - Tamperproof Screws	1
P-764323-811	Protractor, Digital Smart Level	1
P-764324-651	Kit, Tool 3080 Bieri (B4)	1
P-150823-387	• Hose, Size 2-250 mm	1
P-764324-652	• #0202-4-4 Female Pipe Connector	1
P-764324-653	• #G6-PL-S Union #6 to #6	1
P-764324-654	• #BUZ 6-LS-S Plug	2
P-764324-655	• Hex Key Set L Metric	1
P-764324-656	• Socket, 1/2 DR, 24 mm, 12pt Deep	1
P-764324-657	• Wrech Comb. Met., 10 mm Thin, 70° Offset	1
P-764324-658	• Wrech Comb. Met., 13 mm Thin, 70° Offset	1
P-764324-659	• Wrech Comb. Met., 14 mm Thin, 70° Offset	1
P-764324-660	• Wrech Comb. Met., 17 mm Thin, 70° Offset	1
P-764324-661	• Wrech Comb. Met., 19 mm Thin, 70° Offset	1
P-764324-662	• GE6-PL 1/4" NPT-S	1
P-764325-933	Kit, Velcro Adhesive, 1 pt., with Instructions	1
P-755715-499	Stainless Steel Cleaner, Can	1
R-5300-545	Loctite 222, 50cc	1
R-5300-554	Loctite 242, 50cc	1
R-5300-548	Loctite 271, 10cc	1
R-5300-542	Loctite 609, 50cc	1
R-5300-540	Loctite 290, 50cc	1
R-5300-557	Loctite 495, 1 oz	1
P-764322-636	Kit, 3080, Oil, 1 gal.	
P-764326-267	Chevron 680 Oil, 4 oz.	1
P-764322-635	Neptune 7, 4 oz. Tube	1
R-5300-286	Ora Lub Anti-seize	1
R-6400-826	Lubriplate HD-2, 14 oz. Tube	1
R-6200-400	Lint-free Cloth (BAF), Package	1
P-764322-894	Carrying Case	1
P-764319-808	Gray Touch-up Paint (12 oz. spray)	1
Q-150824-612	Gray Touch-up Paint (60cc bottle)	1
R-5300-563	Clear 108 RTV	1
R-5300-006	White 162 RTV	1

The new user-friendly remote hand control system is lightweight, removable, fluid-tight, and shock-resistant, providing new easy articulation capabilities from anywhere around the table.

Standard notched STERIS stainless steel siderail will accept most standard STERIS accessories at notched areas. Gravity latches are provided.

Perineal cut-outs in both the tabletop and X-ray top permit full access to patient.

Built-in kidney elevator (manually operated) will rise 4" from tabletop. Can increase table's flex capability.

Quantum's optional foot control allows raise/lower, trendelenburg and lateral tilt positioning capabilities. Foot control is lightweight, splash-resistant and easy to move. Plugs and receptacles are color-keyed to prevent damage from improper insertion.

Head section screws have been recessed into table frame to help prevent damage or bending from hitting with a patient stretcher. Screws have been captured to minimize removal or loss.

Brass inserts prevent binding when inserting or removing head section.

Keyed hand and foot control plug-in clips help prevent the hand control or foot control from being inserted improperly and damaged.

Cord has been recessed into base to help prevent inadvertent removal. A recessed plug-in jack is provided to remove the line cord.

Smooth, stainless steel, streamlined base with fluid-tight, low-profile, telescoping column maximizes surgical and C-arm access and improves cleanability and service access.

Self-compensating floor locks self-adjust to unevenness in O.R. floors to save time and provide stable surgical work surface.

A 400-pound patient articulation capability accommodates large patients without sacrificing stability.

The headrest support bars have been lengthened so that you can extend the length of the table by another three inches. This presents increased upper body I.A. coverage from 28" to 31", as well as allowing accommodation of taller patients.

Flex/reflex positioning allows coordinated movement of the kidney elevator back and seat section; the positioned patient is articulated on the table in one smooth motion. For additional flex, a built-in kidney body elevator can be used to increase the flex capability.

Table is 75" long x 20" wide to accommodate taller patients easily, X-ray top is available to allow X-ray cassettes along full length of the table.

TUV-approved grounding post accepts the appropriate lock connector. Electrical connection of the patient is assured by a conductive strap placed in contact with the patient's skin, and with the tabletop and table frame. Quantum also has ETL and TUV/GS listing and complies with IEC 601-1 standards.

SURGICAL TABLE SPECIFICATION

1. Remote hand control with 2 foot coiled cord (15 feet long when extended), provides following:
   a. Single command return-to-level function (for RL/SP tables).
   b. Hand control plugs into color-coded receptacle.
   c. Has Power On/Off touch pad with an indicator LED.
   d. Power mode/condition indicator LEDs (AC line, battery and low battery).
   e. Floor lock function and actuate touch pads with LED indicators.
   f. Patient orientation touch pads for preprogramming of normal or reverse orientation.
   g. Position function and actuate touch pads for Trendelenburg, Reverse Trendelenburg, height, side tilt, back, leg and simultaneous flex/reflex.
2. Table Base is cast iron with textured enamel finish with following:
   a. Top is enclosed by a two-section, welded stainless steel cover.
   b. Four conductive swivel coasters.
   c. Three conductive self-compensating floor locks (tripod principle).
   d. Line-power input plug with protective fuses.
   e. Manual foot pedal (hydraulic backup).
   f. Hydraulic pump/motor assembly, power control assembly and control batteries are located within the base.
   g. Motor batteries and motor charger are located within base.
3. Table has a separate override control system which allows operation of basic table functions and floor lock/unlock function should the primary microprocessor system become inoperative.
4. All table articulations safely perform with up to a 400 pound patient.
5. Both table and X-ray tops have a perineal cut-out in the seat section.
6. The foot section lowers 105° giving a standing or seated surgeon perineal access.
7. Manual kidney elevator that will rise 4" from tabletop.

8. Table nominal articulations:
   a. Height: rise 27" to 44" nominal.
   b. Lateral Tilt: 18° nominal from horizontal.
   c. Trendelenburg: 25° nominal from horizontal.
   d. Reverse Trendelenburg: 25° nominal from horizontal.
   e. Back Section: up to 55° nominal or down 25° nominal from horizontal.
   f. Leg Section: up 80° nominal or down 105° nominal from seat section.
   g. Flex: back down 21° nominal with seat down 25° nominal from horizontal.
   h. Reflex: back up 29° nominal with seat up 35° nominal from horizontal.
9. Tabletop:
   a. 20" wide and 75" long, divided into four hinged sections: headrest, back, seat and leg.
   b. 2" pressure management pads.
   c. All sections constructed of a radiolucent material.
   d. A Velcro tape strip on the longitudinal centerline of the tabletop section permitting instant application and removal of mattress pads, even when the pad is reversed.
10. Headrest Extension:
   a. Headrest support bars are capable of extending the length of the table three (3) additional inches.
   b. The headrest can be articulated 90° up and 90° down in 15° increments.
11. Cassette may be positioned from either end of table or either side.
12. Table can be manually controlled in case of power failure.
13. Easy-glide swivel casters with automatic self-compensating floor locks.
14. Drain pan retracts fully so leg section can be raised without removing the tray and extend fully for cyctoscopy procedures.
15. Foot control assembly for use in conjuction with the hand control (with following):
   a. Splash-proof constructed of cast-aluminum with a stainless steel guard.
   b. Has a three foot long coiled cord (14 foot when extended) hospital grade cord and plug.
16. Head/Foot Extension - to provide additional patient support.
17. Headrest Adapter - this will allow use of standard Neuro, Eye and ENT attachments.
18. Radiographic tops complies with the Radiation Control for Health and Safety Act of 10-18-68.

⚠ WARNING! ⚠

PINCHING HAZARD: Pinch points are created during extreme tabletop articulation. Carefully review Figure 3-1 before operating the table.

PINCH POINT WARNINGS

During extreme tabletop articulation, various possible pinch points exist. These points are identified in Figure 3-1. All personnel involved in tabletop positioning should examine and be aware of these points before operating the table.

INSTALLATION

***Note**: Patient grounding post (male connector, DIN 42801) provided in accordance with NFPA 99. Female connector for patient grounding not furnished by STERIS.*

Important: Battery powered tables should be completely charged prior to initial operation. Charge batteries, as described in Section 8.6 before proceeding. If table is to be placed in extended storage, make sure batteries are disconnected and check batteries before reconnecting.

3.1 INSTALL POWER CORD

(See Figure 3-2)

1. Place table at desired location.

   ***Note:** Omit steps 2 and 3 if table is battery powered.*

2. Plug female connector on power cord into male connector on front of table base.

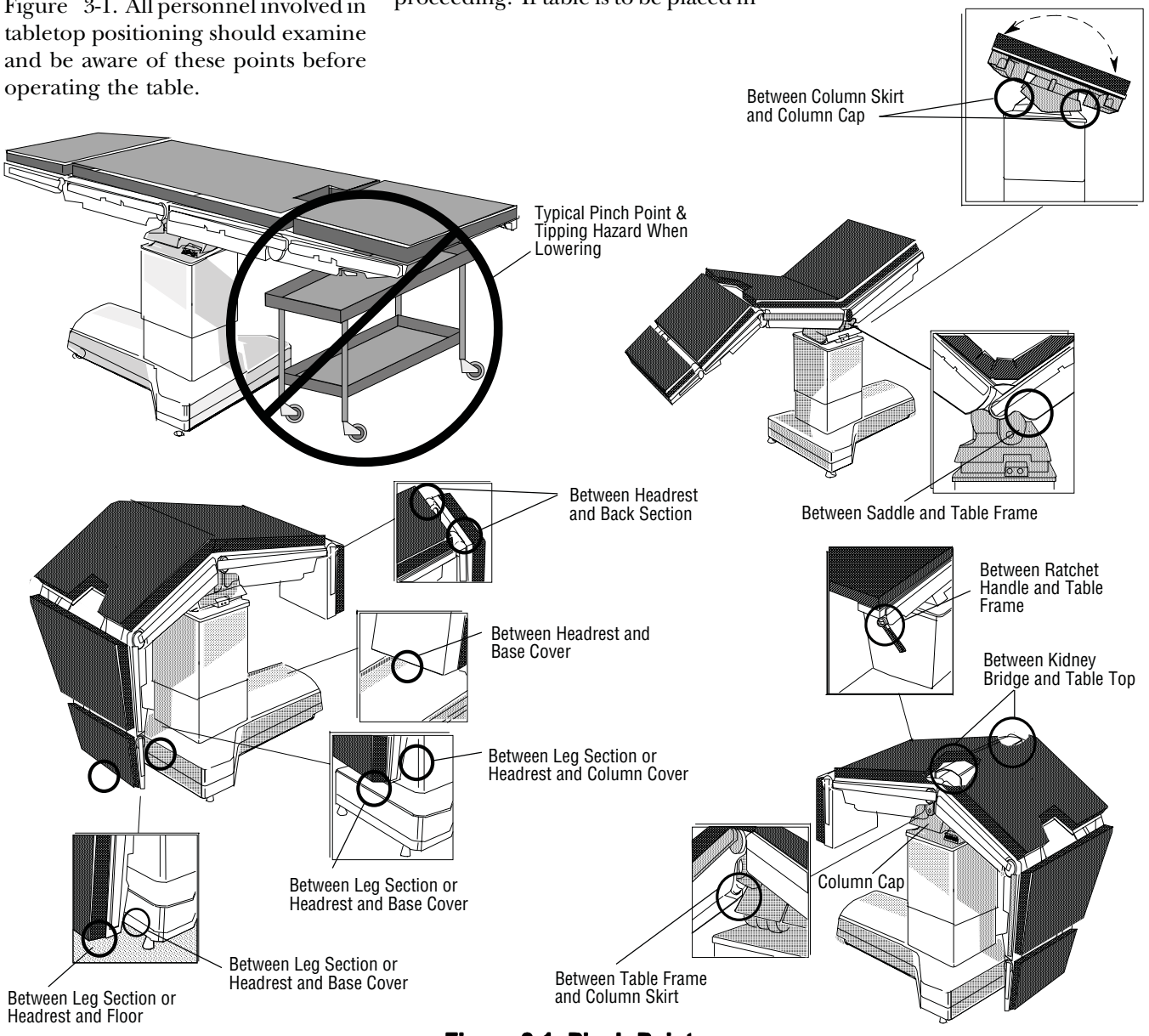

Between Column Skirt and Column Cap
Typical Pinch Point & Tipping Hazard When Lowering
Between Saddle and Table Frame
Between Headrest and Back Section
Between Headrest and Base Cover
Between Leg Section or Headrest and Column Cover
Between Leg Section or Headrest and Base Cover
Between Leg Section or Headrest and Base Cover
Between Leg Section or Headrest and Floor
Between Ratchet Handle and Table Frame
Between Kidney Bridge and Table Top
Column Cap
Between Table Frame and Column Skirt

Figure 3-1. Pinch Points

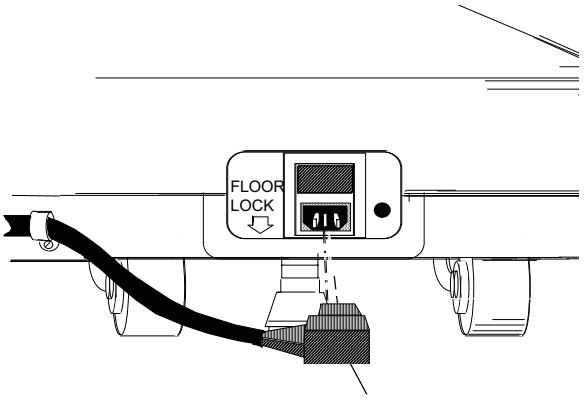


Figure 3-2. Power Cord Connections

⚠ WARNING! ⚠

TRIPPING HAZARD: Route power cord to wall receptacle so that it will not be tripped over by personnel in the area.

3. Plug three-pronged hospital-grade plug into appropriate wall receptacle, routing cord so that it will not be tripped over.

3.2 INSTALL HAND CONTROL

Refer to Figure 3-3 for identification of hand control functions. When a function is actuated, the green LED for that function lights. Problems are indicated by red LEDs. See Table 3-1, Hand Control Diagnostics, to identify problems indicated by red LED lights.

Note: *If the wrong function-selector touch pad is accidentally pressed, press the correct function touch pad to override the incorrect selection.*

1. Align red dot on red hand-control

⚠ CAUTION! ⚠

To avoid damage to hand control, hang it from side rail (or end rail) of table when not in use.

button with red dot on red table receptacle. Push plug into connection (Figure 3-4).

Note: *A spring-loaded locking ring locks plug into receptacle. When disconnecting hand control, pull back on locking ring before pulling plug from receptacle.*

2. Press the ON touch pad at top of hand control. All LEDs on hand control will light momentarily for a control system self-test. The red UNLOCK LED will continue to flash if floor locks are not engaged.
3. Hang hand control on table side or end rail.

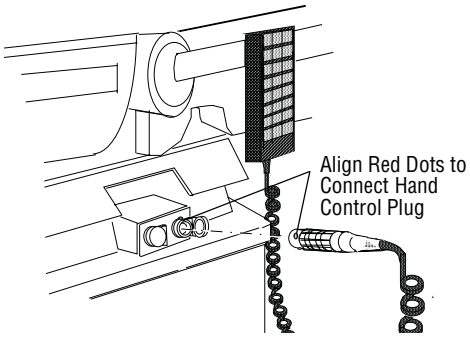
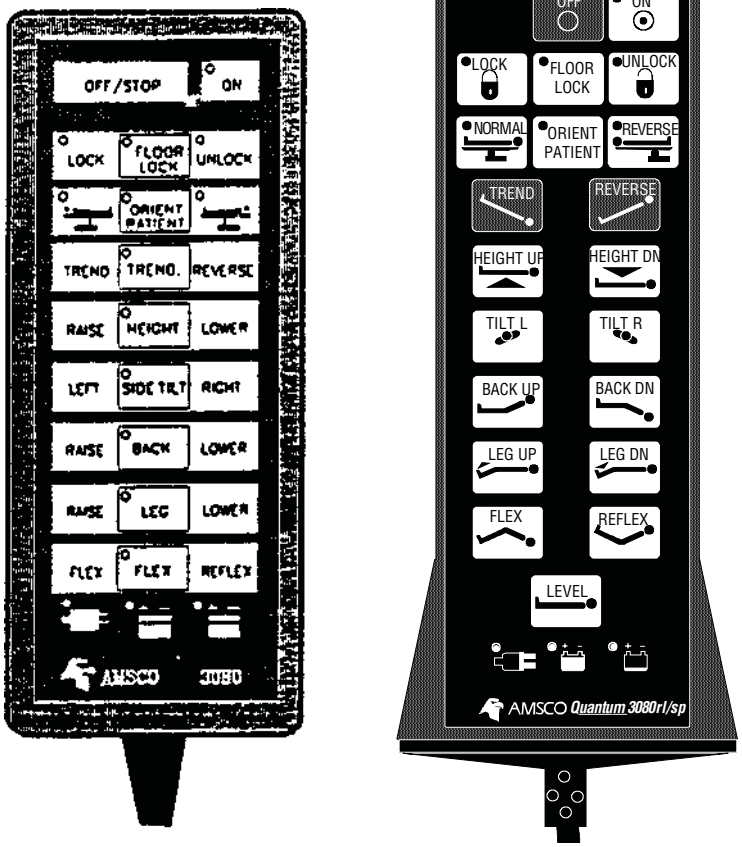


Figure 3-4. Hand Control Connection

3.3 INSTALL OPTIONAL FOOT CONTROL

See Figure 3-9 for identification of foot-control functions. When a function is actuated by a foot-control pedal, the green LED for that function will light on the Pre '92 hand control only.



3080 RC & RL Model - Pre '92 *3080 RC, RL/SP Model - Post '92*

Figure 3-3. Hand Controls

1. Align red dot on gray foot-control plug with red dot of gray table receptacle.
2. Push plug into connection (see Figure 3-5).

Note: *A spring-loaded locking ring locks plug into receptacle. When disconnecting foot control, pull back on locking ring before pulling plug from receptacle.*

3.4 LOCK TABLE IN PLACE

1. Press FLOOR LOCK touch pad (center row of control touch pads) and, **within five seconds**, press the LOCK touch pad adjacent to it. Table is locked in position as floor locks are lowered and casters are raised. Red UNLOCK LED will not stop flashing until floor locks are fully engaged. Table will remain locked (immobile) until UNLOCK function is actuated.
2. Check floor locks to make sure each is snug against the floor.

Note: *Tripodal floor locks are self-compensating for floor irregularities of up to 1/4 inch and should not require adjustment. Floor locks should engage simultaneously and table base should rise evenly. Casters should swing freely when table is in LOCKED position (see Figure 3-6).*

Note: *To unlock table, press FLOOR LOCK touch pad (center row of control touch pads) and, within six seconds, press UNLOCK touch pad adjacent to it on right. Floor locks will retract and table will rest on casters.*

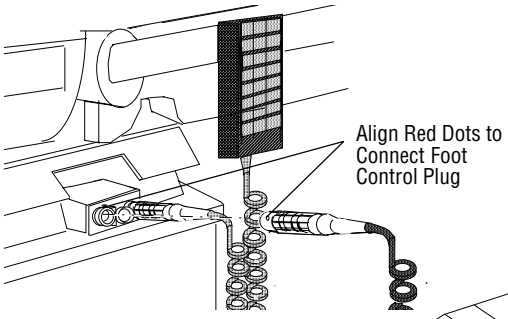


Figure 3-5. Foot Control Connection

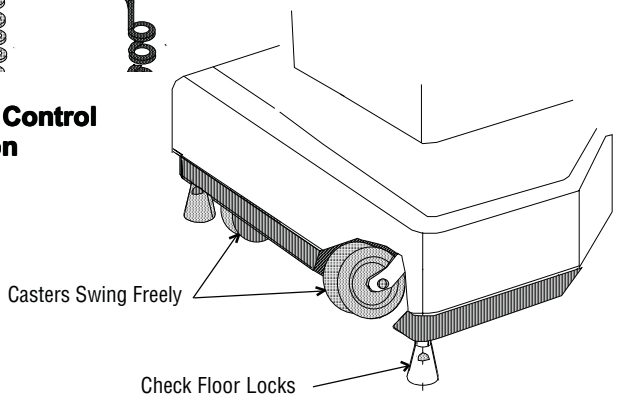


Figure 3-6. Check Floor Locks

TABLE OPERATION

⚠ WARNING! ⚠

PATIENT INJURY HAZARD - The following warnings must be observed when operating this table:

PINCHING HAZARD -Pinch points are created during extreme tabletop articulation. Carefully review Figure 3-1 before operating the table.

TIPPING HAZARD - Do not use table unless floor locks are engaged.

TIPPING HAZARD - 400 pounds is the maximum safe patient weight on this table for the standard surgical positions. Do not use this table for patients exceeding the 400-pound limit. Contact your local STERIS representative for maximum safe patient weight for any position other than those shown in this publication.

TIPPING HAZARD - Obese patients may cause tipping if reversed on this table.

TIPPING HAZARD - Possible patient injury and table failure may result from using this table for patient positions other than those shown. Contact your local STERIS representative with respect to positions not shown in this publication. Patient safety during an operation is the responsibility of the health-care professional present at that time.

FIRE HAZARD - Table is not to be used in the presence of flammable anesthetics.

3.5 ATTACH HEADREST & ORIENT PATIENT

For maximum patient positioning flexibility, table is designed so that headrest can be attached at either end of the table. In order for control to be operable, patient orientation selector on control should match actual patient orientation on table.

Note: *Thumbscrews located under tabletop frame must be loosened before headrest can be attached or removed.*

1. Determine desired patient orientation and attach headrest to the appropriate end of the table. Attach headrest as follows (see Figure 3-7).
   a. Insert headrest attachment rods into the bores in the end of table frame.
b. To secure headrest attachment in place, reach under the tabletop frame and fully tighten the two thumbscrews (one on each side of frame).
2. Verify that POWER is ON and table floor locks are properly engaged.

Note: *If the wrong function selection touch pad is accidentally pressed, press the correct function touch pad to override the incorrect selection.*

3. Press the ORIENT PATIENT function touch pad then, **within six seconds**, press the actuate touch pad for the desired orientation (as shown by illustration on touch pad, see Figure 3-8).

Control is now set to perform all positioning functions in correct relationship to the patient orientation selected.

Important: When REVERSE patient orientation is selected, the FLEX and REFLEX articulation functions are disabled.

3.6 TABLETOP POSITIONING

The tabletop can be articulated within the limits specified by use of the hand control positioning touch pads or by the optional foot control positioning pedals. If a problem arises and table cannot be articulated by use of the hand or optional foot control, the table can be operated as outlined is Section 3.14, Auxiliary Override Systems. Headrest position and kidney bridge elevation must be adjusted manually.

Note: *Battery powered tables should be switched OFF after each procedure to prevent unnecessary battery discharge. If low battery condition is indicated by the hand control, refer to Section 4.6, Battery Charging Procedure.*

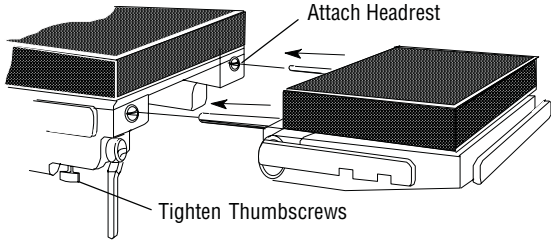


Figure 3-7. Attach Headrest

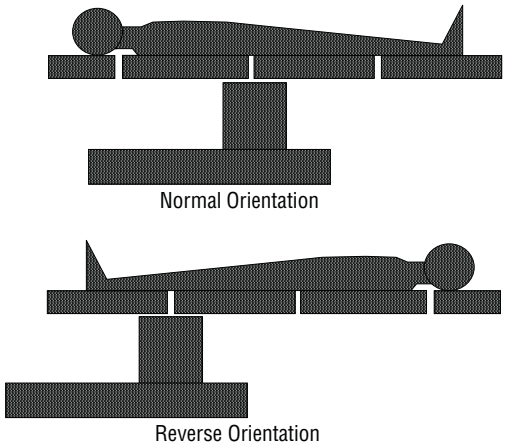


Figure 3-8. Patient Orientation

3.7 HAND CONTROL OPERATION (3080 RC MODELS)

See Figure 3-3. When a function is selected, the green LED for that function lights. See Table 3-1, Hand Control Diagnostics, to identify any problems as indicated by red LEDs on hand control.

The following must be done before any positioning functions are operable:

- Control turned ON
- Floor locks engaged
- Patient orientation on control matches patient orientation on table.

Note: *If the wrong function touch pad is accidentally pressed, press the correct touch pad to override the incorrect selection. The **function** touch pad must always be pressed before the **actuate** touch pad or no movement will occur.*

Important: Table will continue to function normally for **at least 24 hours** after the LOW BATTERY LED illuminates. If LED illuminates during a procedure, complete the procedure and recharge the batteries at the end of the day.

Position tabletop using hand control positioning touch pads as follows:

1. Press the desired **function** touch pad (center row of touch pads), then, **within six seconds** (while function LED is still lit), press the desired **actuate** touch pad adjacent to it.
2. Release the actuate touch pad when desired position has been reached

to automatically stop the tabletop and lock it in position.

3. The range of tabletop movements is as follows:

- **Trendelenburg** - 25 degrees maximum from horizontal
- **Reverse Trendelenburg** - 25 degrees maximum from horizontal
- **Height** - 27 inches minimum to 44 inches maximum
- **Side Tilt** - 18 degrees maximum to right or left of horizontal
- **Back** - Up 55 degrees maximum (80 degrees in REVERSE orientation) or down 25 degrees maximum (105 degrees in REVERSE orientation) from horizontal
- **Leg** - Up 80 degrees maximum (55 degrees in REVERSE orientation) or down 105 degrees maximum (25 degrees in REVERSE orientation) from seat section

Note: *FLEX and REFLEX position controls are disabled when in REVERSE patient orientation.*

- **Flex** - Back down 21 degrees maximum with seat down 25 degrees maximum from horizontal
- **Reflex** - Back up 29 degrees maximum with seat up 35 degrees maximum from horizontal

3.8 HAND CONTROL OPERATION (3080 RL/SP MODELS)

Pre '92 3080 RL

NOTE: The tabletop can be returned to level by simultaneously pressing both "normal orient" and "reverse orient" (level) buttons. The table will move in gradual, anatomically correct increments until it reaches level.

If the "orient patient" select button is depressed while the green function LED is still on, the table will not return to level. Wait for completion of the patient orient function (maximum 6 seconds) before simultaneously pressing "normal orient" and "reverse orient" (level) buttons to activate the return to level function.

Post '92 3080 RL/SP

See Figure 3-3. When a function is selected, the green LED for that function will light. See Table 3-1 to identify problems as indicated by red LEDs on hand control.

The following must be done before any positioning functions are operable:

- Control turned ON
- Floor locks engaged
- Patient orientation on control matches patient orientation on table.

NOTE: If the wrong function selection button is accidentally pressed, press the correct function button to override the incorrect selection. Function button MUST be pressed before actuate button or no movement will occur.

IMPORTANT: Table will continue to function normally for at least 24 hours after the LOW BATTERY LED illuminates. If LED illuminates during a procedure, complete the procedure and recharge the batteries at the end of the day (refer to Section 4.6, BATTERY CHARGING PROCEDURES).

Adjust tabletop position using hand control positioning buttons as follows:

1. Press the desired **Floor Lock** or **Orient Patient** function button in the center row of buttons on the hand control and within five seconds (while function LED is still lit), press the desired actuate button adjacent to it.
2. To move the table to the desired position, simply press the desired actuate touchpad.
3. Release the actuate touchpad when desired position has been reached to automatically stop tabletop and lock it in position.
4. The range of tabletop movements are as indicated in Section 3.7.

The tabletop can be returned to level by pressing the **Level** touchpad. The table will move in gradual, anatomically correct increments until it reaches level.

*NOTE: If the **Level** button is depressed while the green **Orient Patient** function LED is still on, the table will not return to level. Wait for completion of the patient orient function (maximum five seconds) before pressing Level button to activate the return to level function.*

3.9 OPTIONAL FOOT CONTROL OPERATION

An optional foot control is available for use in conjunction with the hand control. The following must be completed before any foot control positioning functions are operable:

- Hand control connected
- Control turned ON
- Floor locks engaged
- Patient orientation on control must match patient orientation on table.

Note: *If foot control and hand control are actuated simultaneously, hand control has priority.*

Position tabletop using foot control positioning pedals (Figure 3-9) as follows:

- **Trendelenburg - 25 degrees maximum from horizontal**

  Depress left (TREND) side of TRENDELENBURG pedal (left foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

- **Reverse Trendelenburg - 25 degrees maximum from horizontal**

  Depress right (REVERSE) side of TRENDELENBURG pedal (left foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

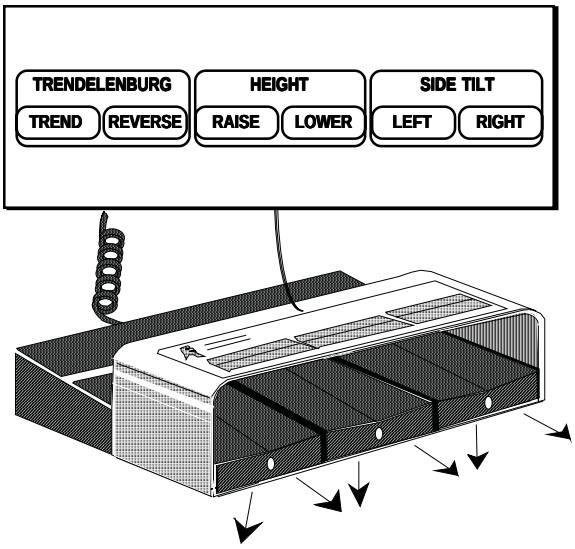


Figure 3-9. Foot Control

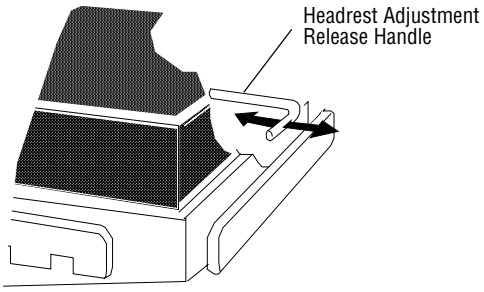


Figure 3-10. Headrest Positioning

- **Raise Height - 44 inches maximum**

  Depress left (RAISE) side of HEIGHT pedal (center foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

- **Lower Height - 27 inches minimum**

  Depress right (LOWER) side of HEIGHT pedal (center foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

- **Side Tilt to Left - 18 degrees maximum from horizontal**

  Depress left (LEFT) side of SIDE TILT pedal (right foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

- **Side Tilt to Right - 18 degrees maximum from horizontal**

  Depress right (RIGHT) side of SIDE TILT pedal (right foot control pedal) to actuate tabletop movement. Release pedal when desired position has been reached to automatically stop tabletop and lock it in position.

3.10 HEADREST POSITIONING

The headrest is manually adjustable 90 degrees upward and 90 degrees downward from horizontal position. Adjust headrest to desired position as follows:

1. Locate spring-loaded release handle under right side of headrest (Figure 3-10), and pull to release.
2. Tilt headrest upward or downward to desired position, let go of release handle, then move headrest slightly until ratchet mechanism locks it into position.

3.11 KIDNEY BRIDGE ELEVATION

Kidney bridge can be manually raised to a maximum height of four inches above the primary tabletop. Adjust kidney bridge as follows (Figure 3-11):

1. Flip down spring-loaded kidney bridge handle (located under left side of back section).
2. Raise kidney bridge as follows:
   a. Press in grooved end of direction selector switch (located in center of ratchet) to raise kidney bridge when ratchet handle is operated in a clockwise direction.
   b. Operate ratchet handle in clockwise direction until desired height is reached.

⚠ WARNING! ⚠

INSTABILITY HAZARD: Possible patient or user injury, as well as table or accessory failure, may result from using STERIS table accessories for other than their stated purpose. . .or from using, on STERIS tables, accessories manufactured and sold by other companies.

3. Lower kidney bridge as follows:
   a. Press in smooth end of direction selector switch to lower kidney bridge when ratchet handle is operated in a counterclockwise direction.
   b. Operate ratchet handle in counterclockwise direction until desired height is reached.
4. Flip ratchet handle back up into stored position when elevation adjustment is complete.

3.12 PADS AND ACCESSORIES

The conductive rubber mattress pads are backed with Velcro strips

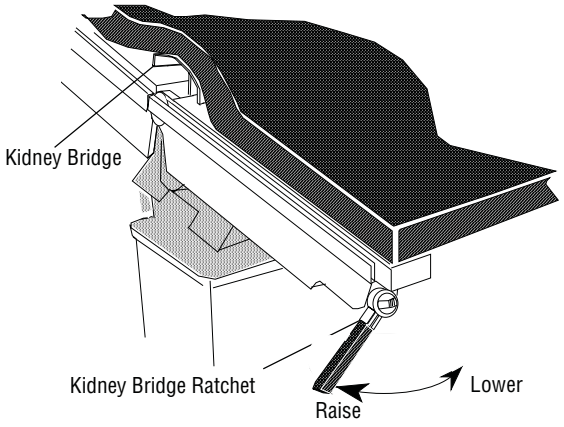


Figure 3-11. Kidney Bridge Adjustment

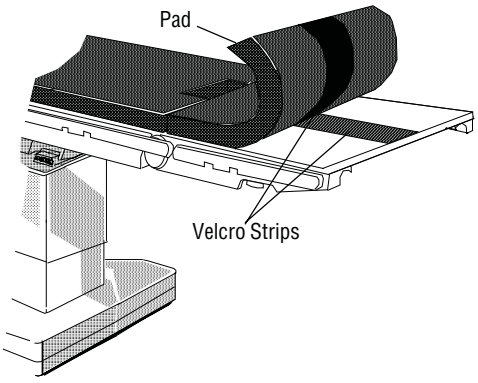


Figure 3-12. Tabletop Pads

which fasten to companion strips on the tabletop (see Figure 3-12). Removable accessories are positioned and secured by clamps or sockets which are attached to (and slide along) the side rails.

3.12.1 Tabletop Pads (Figure 3.12)

1. To install, place pad in position and press Velcro strips together.
2. To remove, "peel" pad away from tabletop.

3.13 OPTIONAL X-RAY TOPS (FIGURES 3-13 AND 3-14)

A four-section X-ray top accessory is available from STERIS for the Series 3080 tables. Each of the top sections has two types of standoff spacers. The shorter spacers rest on the tabletop, while the longer, spring-loaded spacers fit into tabletop mounting holes to secure the sections to the tabletop. The position of the longer spacers must be adjusted for the table which is to receive the X-ray top. Perform the following for each X-ray top section:

1. Loosen the screws holding the spring-loaded spacers to the X-ray top section. Position the section on the table.
2. Rotate the spacers so that the spring clips are in line when viewed from beneath the tabletop.
3. Shift the X-ray top section until the mounting screw shaft on one of the spring-loaded spacers is centered in the hole in the X-ray top section. (A 1/16" clearance is provided between each screw shaft and its X-ray mounting hole.)
4. Hold the spacer to prevent it from rotating and tighten the screw.
5. Make sure that the remaining spring-loaded spacer is flat against the tabletop and center it in its tabletop mounting hole, then tighten the screw.
6. Remove and replace the X-ray top section several times; the X-ray top should lift freely.

Note: *When removing an X-ray top section, grasp it at the corners where the spring-loaded spacers are located and lift*

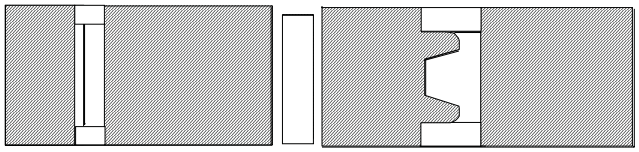


Figure 3-13. X-ray Top Sections

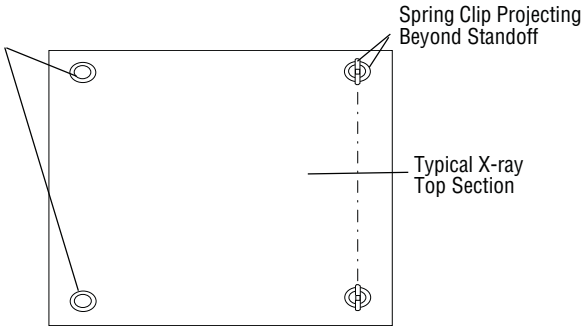


Figure 3-14. X-ray Top Section (Underside)

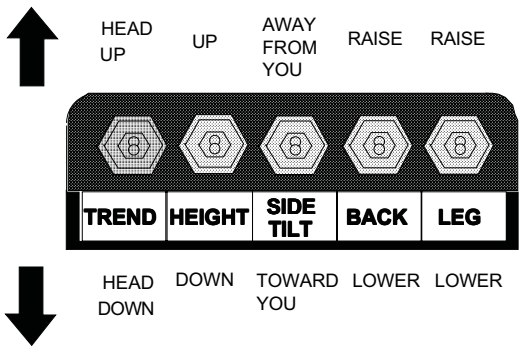


Figure 3-15. Override Switches

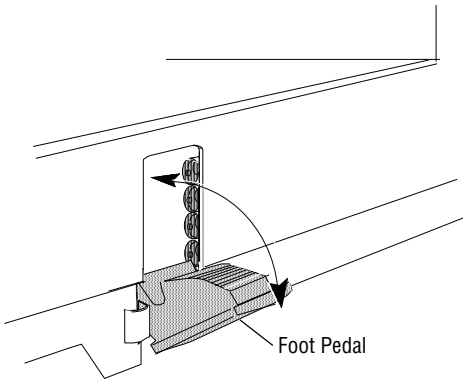


Figure 3-16. Foot Pedal

straight up. Grasping it at the opposite corners will cause the spacers to bind. Repeat the preceding procedure if the spacers bind when section is lifted correctly.

3.14 AUXILIARY OVERRIDE SYSTEMS

See Figure 3-15. If the table hand control is not working, the table is equipped with Auxiliary Override Systems that allow table operation in the event of primary control malfunction. Override systems consist of:

- Tabletop articulation - with electric pump power available, and without electric pump power.
- Floor lock operation

Note: *Table control system* ***automatically actuates NORMAL patient orientation*** *and shuts down primary control when override switches are actuated.*

3.15 MOVEMENT OF TABLE WITH ELECTRIC PUMP POWER AVAILABLE

A row of toggle switches is located at the top of column on the side opposite the hand control connection (Figure 3-15). These switches are to be used for table movements when electric pump power is available but the remote control **is not working**. Articulate table as follows:

- **Trendelenburg - 25 degrees maximum from horizontal**

  Press TREND switch **down** to activate function. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

- **Reverse Trendelenburg - 25 degrees maximum from horizontal**

  Lift TREND switch **up** to activate function. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

- **Height - 27 inches minimum to 44 inches maximum**

  Lift HEIGHT switch **up to raise** tabletop or press **down to lower** tabletop. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

- **Side Tilt - 18 degrees maximum to right or to left of horizontal**

  Lift SIDE TILT switch **up to tilt** tabletop **away from** yourself or press **down to tilt** tabletop **towards** yourself. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

- **Back - Up 55 degrees maximum or down 25 degrees maximum from horizontal**

  Lift BACK switch **up to raise** back section or press **down to lower** back section. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

- **Leg - Up 80 degrees maximum or down 105 degrees maximum from horizontal**

  Lift LEG switch **up to raise** leg section or press **down to lower** leg section. Release switch when desired position has been reached to automatically stop tabletop and lock it in position.

3.16 MOVEMENT OF TABLE WITH NO ELECTRIC PUMP POWER AVAILABLE

The override toggle switches (or hand or foot control selections) are to be used in conjunction with the foot pedal for table movements when no electric pump power is available and the remote control **is not working**.

Articulate table as follows:

1. Flip foot pedal down (Figure 3-16).
2. Operate override toggle switches (or hand or foot control) for the desired movement.
3. Pump foot pedal manually, while still holding toggle switch (or hand or foot control touch pad/pedal)

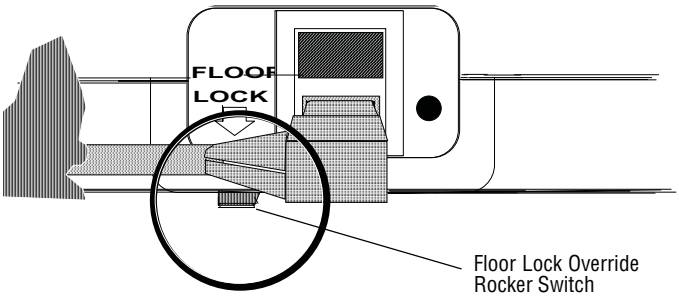


Figure 3-17. Floor Lock Override Switch

in position, until desired degree of movement is obtained.

4. Stop pumping foot pedal and release toggle switch (or hand or foot control touch pad/pedal) to stop movement and lock tabletop in position.

Note: *Although table positioning can be performed without electric pump power, problem should be corrected as soon as possible. Have qualified service technician repair table before further use.*

3.17 FLOOR LOCK OVERRIDE SYSTEM

A floor lock override switch is located under the table base, inward from the AC power connection (see Figure 3-17). Operate the override system as follows:

- **If electric pump power is available,** move rocker switch **towards you** to activate UNLOCK function; release when floor locks are retracted and table is resting on its casters. To activate LOCK function, move rocker switch **away from you**. Release when table is resting on floor locks (casters swing freely).
- **If no electric pump power is available,** with one hand, move rocker switch **towards you** to activate UNLOCK function. Hold switch in position and operate the foot pump with your other hand (or have an assistant pump it) until floor locks are retracted and table is resting on its casters. To activate LOCK function, move and hold rocker switch **away from you** and operate foot pump until table is resting on floor locks (casters swing freely).

TABLE 3-1. HAND CONTROL DIAGNOSTICS CHART		
Indication	**Condition**	**Corrective Action**
Control ON - Green AC LED ON and red BATTERY LED flashing	AC power connected; low or discharged batteries.	Charge batteries.
Control ON - Green BATTERY LED ON and red BATTERY LED flashing.	Battery Operation: Low or dischared batteries - If discharged, control shutdown after 3-1/2 min. when table in use, or after 30 sec. if condition exists at power up.	Charge batteries.
Control ON - Green BATTERY LED (only) ON when table plugged into AC receptacle.	Battery level acceptable; faulty battery charger or power circuit.	Check AC power cord - replace if necessary. Check fuses F1 and F2 - replace if necessary. Reset circuit breaker CB-3. Reset circuit breaker CB-4.
All green and red LEDs flashing.	No communication between table control and hand control.	Check hand control connection. Replace hand control if necessary.
Green "ON" LED flashing.	Optional foot control switch was actuated when hand control switched ON; control logic error disables foot control functions. Faulty foot control - foot control function is disabled.	Turn hand control OFF, then ON to reset controls. Replace foot control.
All LEDs go off.	Hand control unplugged while table control ON - control automatically shuts off after one min. Line Powered Table, AC power off - control automatically shuts off six hours after last function selected. Battery Power Table, floor locks off - control automatically shuts off 30 min. after last function selected. Battery Powered Table, AC power off - control automatically shuts off 24 hours after last function selected.	Reconnect hand control. Reconnect AC power. Activate floor locks. Reconnect AC power.

4.1 GENERAL

WARNING!

TABLE FAILURE HAZARD - The safe and reliable operation of this equipment requires regularly scheduled preventive maintenance in addition to the faithful performance of the routine maintenance described in this section. Repairs and adjustments must be performed only by experienced personnel, fully acquainted with this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage.

Maintenance procedures described in Sections 4.2 through 4.6 should be performed at regular intervals, as indicated. The frequency indicated is the minimum, and should be increased if usage of the table demands. Should a problem occur, refer to Section 6.4, Hydraulic System Troubleshooting or Section 7.3, Electrical System Troubleshooting. Section 4.8 is a sample maintenance record which we suggest the Maintenance Department keep. Such a record proves helpful in ensuring proper maintenance. Quarterly and semi-annual maintenance procedures should be performed only by a qualified technician.

Important: If table is to be placed in extended storage, make sure batteries are disconnected and check batteries before reconnecting. Recharge batteries if stored for more than 6 months.

4.2 CLEANING/DISINFECTING PROCEDURES

CAUTION!

Use only recommended cleaners/ disinfectants on AMSCO tables. Do not use phenolics which may cause patient skin burns if inadequately rinsed off, or alcohol which does not have sufficient cleaning/disinfecting properties.

Use the following materials to perform the cleaning procedures described in this section:

- Several clean, dry lint-free cloths
- Can of AMSCO OR/CS Sprayn' Wipe Cleaner (order number NK351, P-400000-721)
- Container of clean water

Note: *When using disinfectants, manufacturer's label recommendations must be followed.*

4.2.1 After Each Usage

WARNING!

INFECTION HAZARD - Rubber or plastic gloves, masks and eye protection must be worn when cleaning to protect against aerosols being reflected from contaminated surfaces.

1. Remove gross soil with a disposable cloth and place used cloth in an appropriate biohazardous waste-disposal container.
2. Clean tabletop as follows:

CAUTION!

Cleaning procedures requiring table articulation should be performed only by persons familiar with table operation.

   a. Articulate tabletop so that it is level and at a comfortable working height.
   b. Remove tabletop pads by pulling upward to free them from the Velcro fasteners. Place them on another table or other flat surface.

CAUTION!

Read the label of aerosol can thoroughly and follow all directions and cautions as shown.

   c. Hold cleaner spray can six to eight inches from surface and spray cleaning fluid liberally on top and sides of pads. It is recommended to clean only one pad at a time.
   d. Wipe sprayed surfaces with a clean lint-free cloth, dampened with water to remove cleaning fluid. Dampening cloth minimizes streaking.
   e. Wipe cleaned surfaces again with a clean, damp lint-free cloth to remove any remaining residue.
   f. Repeat steps c, d and e for bottom of pads.

CAUTION!

Do not spray cleaning fluid into electric receptacles and avoid spraying directly on override switches.

   g. Repeat steps c, d and e for tabletop surface.
   h. Dry top and bottom of pads.
   i. Place pads on tabletop, align them with tabletop edges and press into place on the Velcro fasteners.
3. Raise table to maximum elevation to access lower surfaces.
4. Clean column skirt, cap, shrouds and entire base surface as follows:
   a. Hold cleaner spray can six to eight inches from surface and spray cleaning fluid liberally on column skirt, cap and shrouds.
   b. Wipe sprayed surfaces with a clean lint-free cloth, dampened with water to remove cleaning fluid.
   c. Wipe cleaned surfaces again with a clean, damp lint-free cloth to remove any remaining residue.
   d. Repeat steps a, b and c for base surface.
5. Turn control OFF when finished cleaning.

4.2.2 At The End of Each Day

1. Perform all cleaning procedures as outlined in Section 4.2.1.
2. Check table casters for any accumulated debris and clean casters as follows:
   a. Make sure table floor locks are in LOCKED position with casters raised clear of floor.
   b. Hold cleaner spray can six to eight inches from caster and spray cleaning fluid liberally on the caster while rotating it.
   c. Wipe caster with a clean cloth, dampened with water, to remove cleaning fluid and debris.
   d. Perform steps b and c for all three casters.

4.2.3 Weekly

1. Perform steps 1 through 4 of the Section 4.2.1 cleaning procedure.
2. Perform step 2 of the Section 4.2.2 cleaning procedure.
3. Articulate table through **all** movements and clean all additional surfaces exposed during these articulations as follows:
   a. Hold cleaner spray can six to eight inches from surface to be cleaned and spray cleaning fluid liberally on surface.
   b. Wipe sprayed surfaces with a clean lint-free cloth, dampened with water to remove cleaning fluid.
   c. Wipe cleaned surfaces again with a clean, damp lint-free cloth to remove any remaining residue.
4. Turn control OFF when finished with cleaning procedure.

Note: *For periodic polishing, use AMSCO Stainless-Steel Cleaner (P755715-499). Polishing with this cleaner should be performed* ***after*** *proper disinfecting as this cleaner is* ***not*** *a disinfectant.*

4.3 BI-WEEKLY MAINTENANCE

Note: *Battery-powered tables should have the batteries charged a* ***minimum of 38 hours every two weeks*** *(more often if table usage demands).*

1. Charge batteries as outlined in Section 4.6.
2. Operate each table function. Operation should be smooth and quiet. If it is not, have a qualified technician repair the table. Never permit inexperienced, unqualified persons to attempt to make any repairs to the table.

4.4 MONTHLY MAINTENANCE

⚠ WARNING! ⚠

SHOCK HAZARD - Electrically conductive properties of casters and floor locks must be monitored. Before placing table in use, measure their resistance level according to the requirements of NFPA 99. Perform subsequent routine testing at least once a month.

1. Clean casters and floor locks; check for conductivity.
2. Remove any oil (suture, floor wax, etc.) that may have accumulated on casters.
3. Clean casters with a recommended solution.
4. Lightly lubricate caster bearings with Lubriplate No. R-6400-826 or equivalent.

4.5 "AS NECESSARY" MAINTENANCE

The following repair procedures are to be performed whenever necessary.

Note: *If circuit breaker continues to trip, fuse(s) continue to blow, or condition is not corrected by resetting the circuit breaker or replacing the fuse(s), have a qualified technician check facility power or repair the table.*

4.5.1 Resetting Circuit Breakers

Four circuit breakers, CB-1, CB-2, CB3 and CB-4, protect various table components as follows:

- CB-1 - Power Transformer
- CB-2 - Motor Batteries
- CB-3 - Control Battery Charger
- CB-4 - Motor Battery Charger

Circuit breakers can be reset if tripped by a fault condition.

When tripped, the circuit breaker pops out and is readily detectable. Reset circuit breakers as follows:

1. Lower foot pedal on table base to access the circuit breakers (Figure 4-1).
2. To reset, press in on protective boot covering circuit breaker.
3. Raise foot pedal back into stored position.

4.5.2 Change Fuses

Two replaceable fuses (F1 and F2, 6 amp) are located in a cartridge above the AC input in the table base (Figure 4-2). If one or both of the fuses are blown by a fault condition, replace as follows:

1. Disconnect AC power cord from wall receptacle and table base.
2. To access the fuses, pry cartridge out with a small screwdriver.
3. Remove blown fuse(s) and replace.
4. Push cartridge back into connected position and reconnect AC power cord to table. Plug cord into wall receptacle.

4.6 BATTERY CHARGING PROCEDURE

Line-powered table control batteries are automatically recharged when the

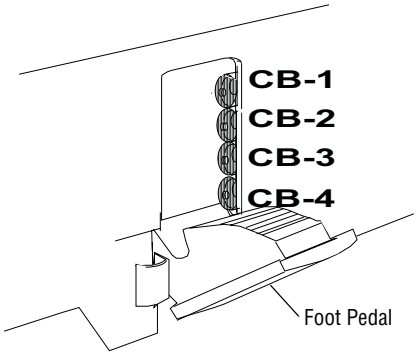


Figure 4-1. Circuit Breakers

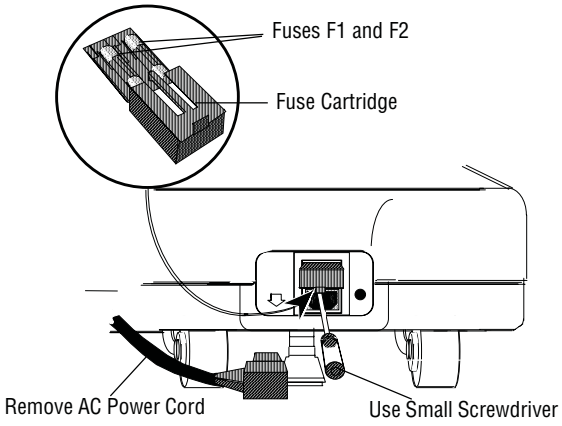


Figure 4-2. Fuse Location

table is being used and do not require additional charging.

Battery-powered table motor and control batteries require recharging on a periodic basis depending on table usage. Low or discharged battery conditions are indicated by LEDs on the hand control. Recharge batteries at the following times:

- When table is first put into service
- Every two weeks when table is in normal service . . .more often if usage demands
- Whenever low-battery indicator LED is on

Note: *If batteries will not charge, check for the following:*

- F1 and F2 fuses blown - replace if necessary
- AC power cord defective - replace if necessary
- Circuit breaker CB-2, CB-3 or CB-4 tripped - reset if necessary

Recharge batteries as follows:

1. Connect AC power cord to table base and plug into an appropriate AC receptacle.
2. Allow **a minimum of 38 hours** for full battery charge (see Table 4-1).
3. Verify low-battery indicator LED is off and disconnect AC power.

4.7 TABLE LUBRICATION

Lubricate table parts as outlined in Table 4-2.

TABLE 4-1. BATTERY CHARGING

Charging Time	Percent Charge
24 hours	90%
36 hours	95%
48 hours	100%

TABLE 4-2. LUBRICATION SCHEDULE

Lubricant	Table Section	Frequency
Lubriplate HD2	Kidney Bridge Gears	Bi-Annually
ORE LUBE	Seat Section Clevis Pin	Bi-Annually
	Leg Section Clevis Pin	Bi-Annually
	Pivot Pin in Saddle	Whenever Removed
	Floor Lock Pin	Bi-Annually
	Floor Lock Housing	Bi-Annually
Chevron 680	Column Bearings	Annually

4.8 PREVENTIVE MAINTENANCE GUIDE

EQUIPMENT: Quantum 3080RC/RL Surgical Tables

This form is to be used as a preventive maintenance record and, along with **Section 4** instructions, as a guide to performing preventive maintenance. (Cross out "o" in column when service is performed. Pages 4-4 and 4-5 should be removed and photocopied to provide a record of regularly scheduled maintenance on the table.)

Note: *The Preventive Maintenance Guide is based on bi-monthly inspections.*

Service Required: (Inspection Period)	**1**		**2**		**3**		**4**	
Date of Service:								
P/M Performed By:								
1.0 PREPARATION FOR PREVENTIVE MAINTENANCE								
1.1 Discuss equipment operation with department personnel	o		o		o		o	
1.2 Examine side rail hardware, tighten as required	o		o		o		o	
1.3 Check x-ray tops for tightness of standoffs	o		o		o		o	
1.4 Check integrity of cap shroud	o		o		o		o	
2.0 HYDRAULIC SYSTEM								
2.1 Replace oil filter element	o							
2.2 Check hydraulic oil level	o		o		o		o	
2.3 Check table base, all hoses, fittings, and components of hydraulic system for evidence of oil leaks	o		o		o		o	
3.0 CASTERS AND FLOOR LOCKS								
3.1 Check/clean casters	o		o		o		o	
3.2 Lubricate casters							o	
3.3 Check floor lock system and adjust if needed per Maintenance Manual	o		o		o		o	
3.4 Verify the presence of all foot pads	o		o		o		o	
4.0 CONTROLS								
4.1 Verify proper operation of all articulations for full motion								
4.1.1 Using hand control	o		o		o		o	
4.1.2 Using override function	o		o		o		o	
4.1.3 Using manual control (foot pump)	o		o		o		o	
4.1.4 Using foot control (if equipped)	o		o		o		o	
4.1.5 Using battery power (if equipped)	o		o		o		o	
4.2 check integrity of hand control and cord	o		o		o		o	
5.0 ELECTRICAL CHECKS								
5.1 Check that all circuit boards, connectors, and cable plugs are tight	o		o		o		o	

4.8 PREVENTIVE MAINTENANCE GUIDE (continued)

Service Required: (Inspection Period)	**1**		**2**		**3**		**4**	
Date of Service:								
P/M Performed By:								
5.2 Check all cables for damage or fraying	o		o		o		o	
5.3 Verify battery charger voltage (28 volts +/- 1 volt)	o				o			
5.4 Verify battery voltage (12 volts per battery)	o				o			
6.0 TABLE RIGIDITY								
6.1 Check tabletop for any horizontal or vertical play			o				o	
6.2 Check side tilt mechanism for any play			o				o	
6.3 Lubricate column guide rails			o					
7.0 FINAL TEST								
7.1 Secure all covers and shrouds	o		o		o		o	
7.2 Reinstall any pads that were removed	o		o		o		o	
7.3 Check area to insure removal of all materials used during inspection	o		o		o		o	

Key:

A = Adjusted	M = Missing	T = Tested	* = Checked
X = Calibrated	N = New (Replaced)	L = Lubricated	N/A = Not Applicable
C = Cleaned	R = Rebuilt/Repaired	W = Worn	
D = Damaged	S = Setpoint Verified		

⚠ CAUTION! ⚠

Static electricity can damage microprocessor controls. Indiscriminate probing of circuits or improper connections may result in immediate or delayed electrical failure. If the electronics are to be accessed, use a personal grounding device. Exercise care in all activities involving the electronic circuitry.

Always connect power cord to a properly grounded socket.

5.1 INTRODUCTION

Unless otherwise specified, all tabletop sections are designated by their names for a patient in the normal (not reversed) position. Also, all tests requiring table articulation are to be done utilizing the hand control with the LEFT patient orientation button (normal position) actuated, and with the table plugged in and supplied with its specified voltage.

5.2 TEST INSTRUMENTATION REQUIRED

1. Spring scale - P-757290-091.
2. Pressure gauge - P-764322-738.
3. Protractor - P-764322-747.
4. Lint-free cloth - R6200-400.

5.3 HYDRAULIC PUMP RELIEF VALVE (for tables with serial #'s beginning with B4)

NOTE: On some manifolds on the Bieri motor/pump, the relief valve is on the outer edge instead of the inner edge. In this situation, the batteries do not have to be removed.

1. Remove the batteries as outlined in procedure 12.8.
2. Remove the cap from the pressure test port located on the pump pressure port banjo fitting (see Figure 5-1).
3. Install the pressure gauge into the test port using the DIN (European) adapter.
4. Using the override switches, operate a table function to the end of its limit (mechanical stop). With the movement stopped but the pump still running (pump dead-headed), check the relief valve setting by monitoring the gauge. The setting should be 1750 (-25 or + 50) psi.
5. If adjustment is necessary, loosen the locking or jam nut on the adjusting screw. Rotate the adjusting screw until the proper pressure is reached.
6. Remove the pressure gauge and reinsert the test cap.
7. Reinstall the battery.

5.4 HYDRAULIC PUMP RELIEF VALVE (for tables with

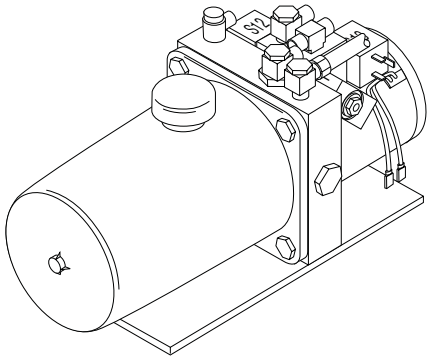


Figure 5.1 - Hydraulic Pump Relief Valve (B4 Tables)

serial #'s beginning with 04)

1. Remove the plug from the pressure test port located on the base manifold block (see Figure 5-1a).
2. Install the pressure gauge into the test port using the SAE adapter.
3. Using the override switches, operate a table function to the end of its limit (mechanical stop). With the movement stopped but the pump still running (pump dead-headed), check the relief vavle setting by monitoring the gauge. The setting should be 1400-1450 psi.
4. If adjustment is necessary, loosen the locking or jam nut on the adjusting screw. Rotate adjusting nut until the proper pressure is reached.
5. Remove the pressure gauge and reinsert the test plug.

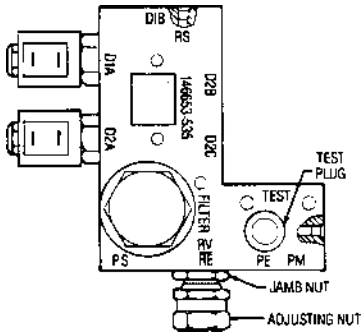


Figure 5.1a - Hydraulic Pump Relief Valve (04 Tables)

5.5 TABLE OBSERVATION

1. Check entire table for proper fit and finish of all exposed parts. Check for any burrs, sharp edges or corners to which users could be exposed. Correct as necessary.
2. Using a Clark socket, be sure socket slides freely over each side rail and that the rivet stops and gravity locks prevent the socket from being removed. Be sure each gravity lock swings freely.
3. Flip the foot pump pedal up and down several times to be sure it pivots smoothly and stays in position.
4. Articulate the headrest throughout its range (+90° to -90°). Be sure the ratchet action is normal and the release handle operation is smooth throughout the range.
5. Raise the kidney bridge to its maximum height (top surface of bridge should be at least 3-7/8" from top surface of leveled back section). Be sure ratchet action is smooth

and normal throughout. Flip handle into and out of its stowed position several times, be sure detent retains handle in the stowed position.

5.6 TABLE MOBILITY

Note: *The following tests are to be done with the floor locks disengaged, with the tabletop horizontal and at maximum elevation, and on a smooth level surface.*

1. Move the table forward, backward, left and right. . . three feet minimum in each direction. Be sure the casters operate smoothly and without unusual noise.
2. Move the table longitudinally, with the headrest leading, until the casters are aligned for movement in that direction. Attach a spring scale to end of leg section on table centerline. Slowly push table straight ahead. Gauge reading should be less than 35 pounds.
3. With table in same alignment, slowly push at right angles to table centerline, at outboard end of left side rail on table headrest. Gauge reading should be less than 20 pounds.

5.7 FLOOR LOCK ASSEMBLY

1. With table on a level floor, engage the floor locks. Check distance between each caster and floor, it should be 1/4 ± 1/32". If adjustment is necessary, refer to Section 8.15.8.

5.8 TABLE ARTICULATION

1. Articulate each table function through the entire range and ensure that there are no unusual noises, speed variations or other performance problems. Table speed and range of movement should fall within parameters shown in Table 5-1.
2. Actuate the RAISE function for at least 30 seconds. This causes the pump to develop maximum pressure and the relief valve to be fully employed. There should be no chattering, squealing, or other unusual noises.
3. Refer to Table 5-2 (for electric table) and Table 5-3 (for battery-powered table) and articulate the table through the various functions using the conditions described. (**Note:** If a battery table, the base

TABLE 5-1. TABLE ARTICULATION MOVEME

Articulation	Note	Units	Movement	
			Min.	Max
Minimum Elev.	(1)	inches	26.5	27.5
Maximum Elev.	(1)	inches	43.5	44.5
Left Tilt	(2)	degrees	16.0	20.0
Right Tilt	(2)	degrees	16.0	20.0
Trendelenburg	(2,4)	degrees	22.0	27.0
Rev. Trend.	(2,5,6)	degrees	22.0	27.0
Back Up	(2)	degrees	53.0	57.0
Back Down	(2,6)	degrees	-23.0	-27.0
Leg Up	(3)	degrees	79.0	81.0
Leg Down	(3)	degrees	-104.0	-107.

NOTES:
(1) From floor to leveled back top surface, no pads
(2) Referenced to the column stage block
(3) Referenced to seat section.
(4) Measure back section angle.
(5) Measure seat section angle.
(6) Assure overtravel by actuating override switch.

TABLE 5-2. TEST FUNCTIONS, ELECTRIC TABLE		
AC Cord	Pump	Control
Connected	Electric	Foot Control
Connected	Electric	Override Switches
Disconnected	Manual	Hand Control
Disconnected	Manual	Foot Control
Disconnected	Manual	Override Switches

TABLE 5-3. TEST FUNCTIONS, BATTERY OPERATED TABLE			
AC Cord	Motor Bat.	Pump	Control
Connected	Connected	Electric	Foot Control
Connected	Connected	Electric	Override Switches
Disconnected	Connected	Electric	Foot Control
Disconnected	Connected	Electric	Override Switches
Disconnected	Disconnected	Manual	Hand Control
Disconnected	Disconnected	Manual	Foot Control
Disconnected	Disconnected	Manual	Override Switches

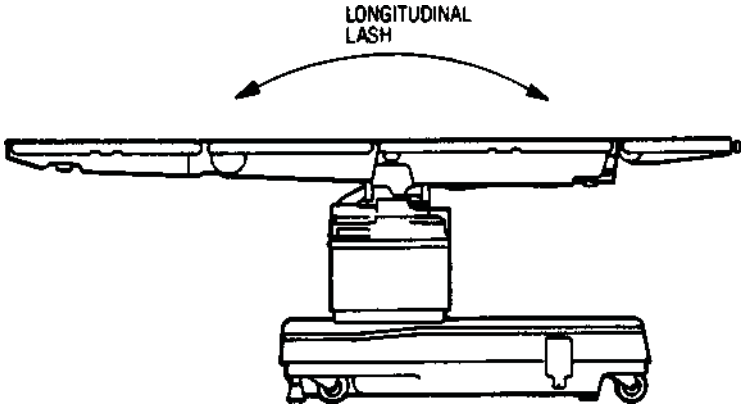


Figure 5-2. Longitudinal Lash

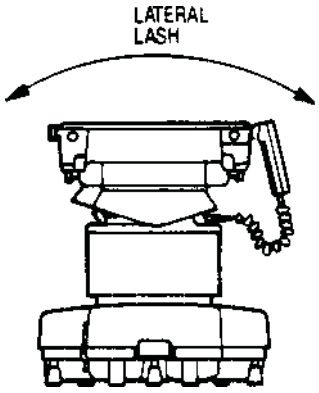


Figure 5-3. Lateral Lash

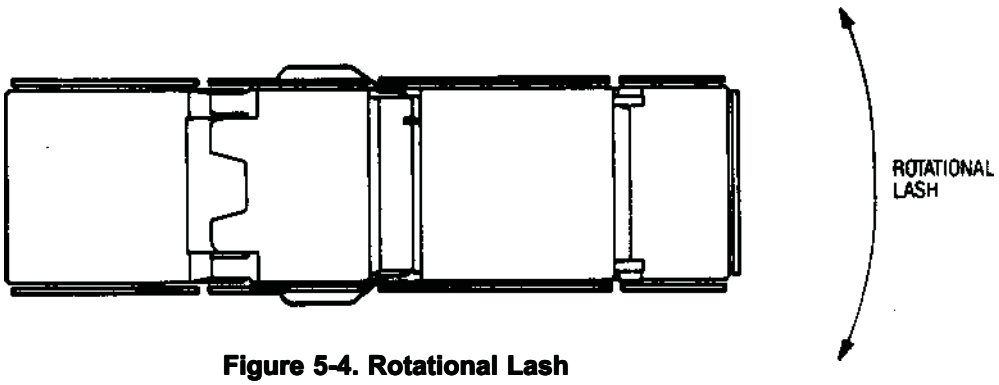


Figure 5-4. Rotational Lash

shroud must be removed for the last three conditions - see Step 4.)

4. Remove table column and base shrouds as described in Section 8.2.
5. Thoroughly examine table assembly for evidence of any hydraulic leaks, mechanical wear, electrical wire abrasion, or any other degradation. Articulate each table function again through the entire range and ensure that there are no unusual noises, speed variations, or other performance problems.

5.9 TABLETOP RAISE/LOWER

1. Lower table to minimum elevation. Check distance from floor to leveled back top surface (without pad). See Table 5-1.
2. Raise table to maximum elevation. Check distance from floor to leveled back top surface (without pad). See Table 5-1.
3. With table at maximum elevation, check limit switch LS5. The switch should be made (roller engages "V" slot) at 1/16" (± 1/32") before table reaches its maximum mechanical stop. If necessary, loosen the switch mounting bracket screws and reposition the switch so that is the case. Repeat Step 2.

Note: *The following test is to check tabletop lash which falls into three categories: longitudinal as shown in Figure 5-2, lateral as shown in Figure 5-3, and rotational as shown in Figure 5-4. It is normal for the tabletop to have a certain amount of lash and adjustments should be made only when the lash exceeds the amount specified.*

4. Engage floor locks, level tabletop and raise table to maximum elevation.
   a. **Longitudinal Lash and Rigidity:** Hang or apply 50 pounds of force on the end of the headrest on the table centerline. Measure the amount of vertical movement at the outboard end of the left back-section siderail when the 50-pound weight is moved to the end of the leg section on the table centerline. The measurement shall not exceed 1/4".
   b. **Lateral Lash and Rigidity:** Hang or apply 50 pounds of force on the left side rail at the seat/back joint. Measure the amount of vertical movement at the outboard end of the left back section when the 50-pound weight is moved to the right side. The measurement shall not exceed 3/32".
   c. **Rotational Lash and Rigidity:** Push in the horizontal plane with 50 pounds applied (or 50 pounds force exerted) at right angles to the outboard end of the right leg-section siderail. Measure the amount of movement at the outboard end of the left back-section siderail when the 50 pounds is removed and a push of 50 pounds is applied to the outboard end of the right back- section siderail. The measurement shall not exceed 3/16".

Note: *If it is determined that the tabletop has excessive lash, check to be sure the lash is due to the column being out of adjustment. With the column and base shrouds removed, apply an alternating load to the tabletop as outlined above while observing the column for motion between its upper and lower sections. If the lash is due to the column, it should be adjusted as outlined in Step 5.*

5. Position tabletop to minimize the load on the column. Attach the headrest to the back section. Actuate the leg section to its full up position. Level the seat section, back section and headrest. See Section 8 for information on lash adjustment.

Note: *Take care not to remove all the column lash and inadvertently make the column too tight, creating excessive loads on the bearings and producing premature bearing failure. It is also possible to produce a sticking condition on the column so that it will not lower after remaining at one height for a period of time.*

5.10 TABLETOP TILT

1. Articulate the tabletop in full lateral LEFT TILT and then full lateral RIGHT TILT. Tilt as referenced to the column stage block should be 18 ±1 degrees.
2. The maximum right and left tilts must be within two degrees of each other. Calculate the difference by subtracting the recorded right tilt angle from the left tilt angle. If necessary, adjust cylinder rod (see Section 12.3.8).

5.11 TABLETOP LIMIT SWITCHES

⚠ WARNING! ⚠

INJURY HAZARD: Pinch point areas exist between top sections and saddle casting. Keep hands clear while moving top and turn table off during adjustments.

5.11.1 LS3 - SEAT SECTION LIMIT SWITCH

1. With the tabletop sections horizontal, manually depress limit switch LS3, mounted to saddle under seat section. Attempt to actuate FLEX. The pump should turn on, but no motion should occur. Repeat for REVERSE TRENDELENBURG.
2. With the switch released, actuate the same functions. When motion has started, depress the switch. The pump should stay on and motion should stop.

3. Starting with the tabletop horizontal, actuate BACK RAISE at least 10 degrees to insure that the articulation actuates the seat limit switch. Actuate REVERSE TRENDELENBURG until motion stops. Check that the seat limit switch LS3 actually stopped the motion by actuating REVERSE TRENDELENBURG with the override control switches located on the shroud cap. The seat section should move further down by a small amount.
4. If limit switch LS3 does not function as described above, check to be sure it is being actuated when seat section is within 0.5 ±0.3 degrees of its mechanical stop (use REVERSE TRENDELENBURG function). If limit switch requires adjustment, see Section 8.

5.11.2 LS4 - BACK SECTION LIMIT SWITCH

1. With the tabletop sections horizontal, manually depress the switch mounted to the underside of the back section. Attempt to actuate FLEX. The pump should turn on, but no motions should occur. Repeat for TRENDELENBURG and BACK LOWER.
2. With the switch released, actuate the same functions. When motion has started, depress the switch. The pump should stay on and motion should stop.
3. Starting with the tabletop horizontal, actuate BACK LOWER until motion stops. Check that motion stopped due to the back limit switch by actuating BACK LOWER with the override control switches located on the shroud cap. The back section should move further down by a small amount.
4. If limit switch LS4 does not function as described above, check to be sure it is being actuated when back section is within 0.5 ±0.3 degrees of its mechanical stop (use TRENDELENBURG function). If the limit switch requires adjustment, see Section 8.

5.11.3 LS5 - COLUMN LIMIT SWITCH

1. Using the override control switches, raise the tabletop to its maximum height.
2. Lower tabletop approximately 1/16" from maximum position.
3. Set LS5 height and depth so that the switch disengages when the roller on the actuator connects with the "V" slot.
4. Tighten switch mounting bracket screws.
5. Using hand control, actuate tabletop RAISE and LOWER functions, checking to make sure LS5 stops table motion 1/16" ±1/32" before maximum table height.

5.12 TABLETOP BACK SECTION

Note: *The back section is powered by two hydraulic cylinders, one on each side. The cylinder stroke is fixed and may not be the same on both sides. Unequal stroke produces greater articulation on one side than the other and the cylinders must be adjusted to balance any overtravel. This minimizes racking or twisting of the back section when in the full UP or DOWN position.*

1. Articulate back section to its full DOWN position (use normal patient orientation). Measure and record angular position of both right and left side as referenced to the column stage block. The measured angles must be 25 ±1 degree. The amount of racking must be 1/2 degree or less.
2. If adjustment is necessary, raise back approximately 5 degrees from its maximum DOWN position to expose the cylinder rod turning hole. Turn cylinder rod into clevis to increase DOWN articulation, and out of clevis to decrease articulation. One degree change is equal to 1.1 revolutions of the rod in the clevis. Apply Loctite 290 (wicking grade) to Rod/Clevis to relock adjustment.
3. Articulate back section to its full UP position. Measure and record the angular position of both the right and left side. It must be 55 ±1 degree and the amount of racking must be 1/2 degree or less. If not, adjustments must be made to equalize the amount of racking in the maximum UP and DOWN position. Repeat steps 1 through 3 as necessary.

5.13 TABLETOP SEAT SECTION (Trendelenburg/Reverse Trendelenburg)

1. Articulate the seat section to its full DOWN position. Measure and record its angle as referenced to the column stage block. It should be 25 ±1 degree.
2. If adjustment is necessary, raise the seat section to horizontal or above, and loosen jam nut. Turn knuckle into cylinder rod by rotating the rod to increase DOWN articulation, and out of the cylinder rod to decrease articulation. One degree change is equal to 1.18 revolutions of the knuckle in the rod. Tighten jam nut against cylinder rod.
3. Repeat step 1. The measured angle must be 25 ±1 degree. Repeat step 2 if necessary.

5.14 TABLETOP LEG SECTION

Note: *The leg section's articulation is powered by two hydraulic cylinders; one on the right side and one on the left side. The stroke of the cylinders is adjustable with cylinder rod stops to provide the same total articulation on each side. The leg section adjustment is made without the top leg board and all angles are measured with respect to the seat section casting.*

1. Articulate the leg section to its full up position using override switches. Measure and record the angle of each leg frame.
2. The up adjustment is made with shims (37 & 38) between the seat section frame (14) and cap end cylinder clevis. Add shims to increase the angle or remove shims to decrease the angle. 0.010 inches of shim will alter the angle by approximately 1.0 degree.
3. Loosen the cap screws (40), insert or remove the required shim thickness to give a maximum up position of 80 degrees, then tighten the cap screws. Better screw access is attained if the seat section is raised slightly.
4. Repeat step. The measured angles must be 81 $\pm$ 1 degrees and within one degree of one another. Repeat steps 3 through 5 if necessary.
5. Remove the cap screws one at a time to apply Loctite (106), then tighten.
6. Articulate the leg section to its full down position, measure and record the angle of each leg section frame.
7. The down adjustment is made by rotating the cylinder rod stops on the cylinder rods. Turn the cylinder rod stops toward the cylinder body to decrease maximum down articulation or away from the body to increase articulation. 1/8 revolution of the stop will alter the angle by about 1 degree.
    a. For the right cylinder, which has the return to level hardware attached to it, the attachment bracket (see Figure 9-18) must be removed prior to "leg down" adjustment. It is important that the cylinder rod stop be adjusted such that one of the radial tapped holes is vertical with respect to the cylinder body.
8. Back the articulation away from its maximum down position a fraction of a degree to allow easy rotation of the cylinder rod stop. Make the necessary adjustment based on steps 6 and 7 to give a maximum down angle of 105 degrees.
9. Repeat step 6. The measured angles must be 105 $\pm$ 1 degrees and within one degree of each other. Repeat steps 7 and 8 if necessary.
10. Apply Loctite (106) to the set screws (108) and tighten in the cylinder rod stops.
11. Double check all four adjustments. Correct as required.

5.15 SELF LEVELING TEST PROCEDURE (RL & SP only)

1. Position the table top such that the following positions are at least 10 degrees from level:

left tilt	seat up
back up	leg down

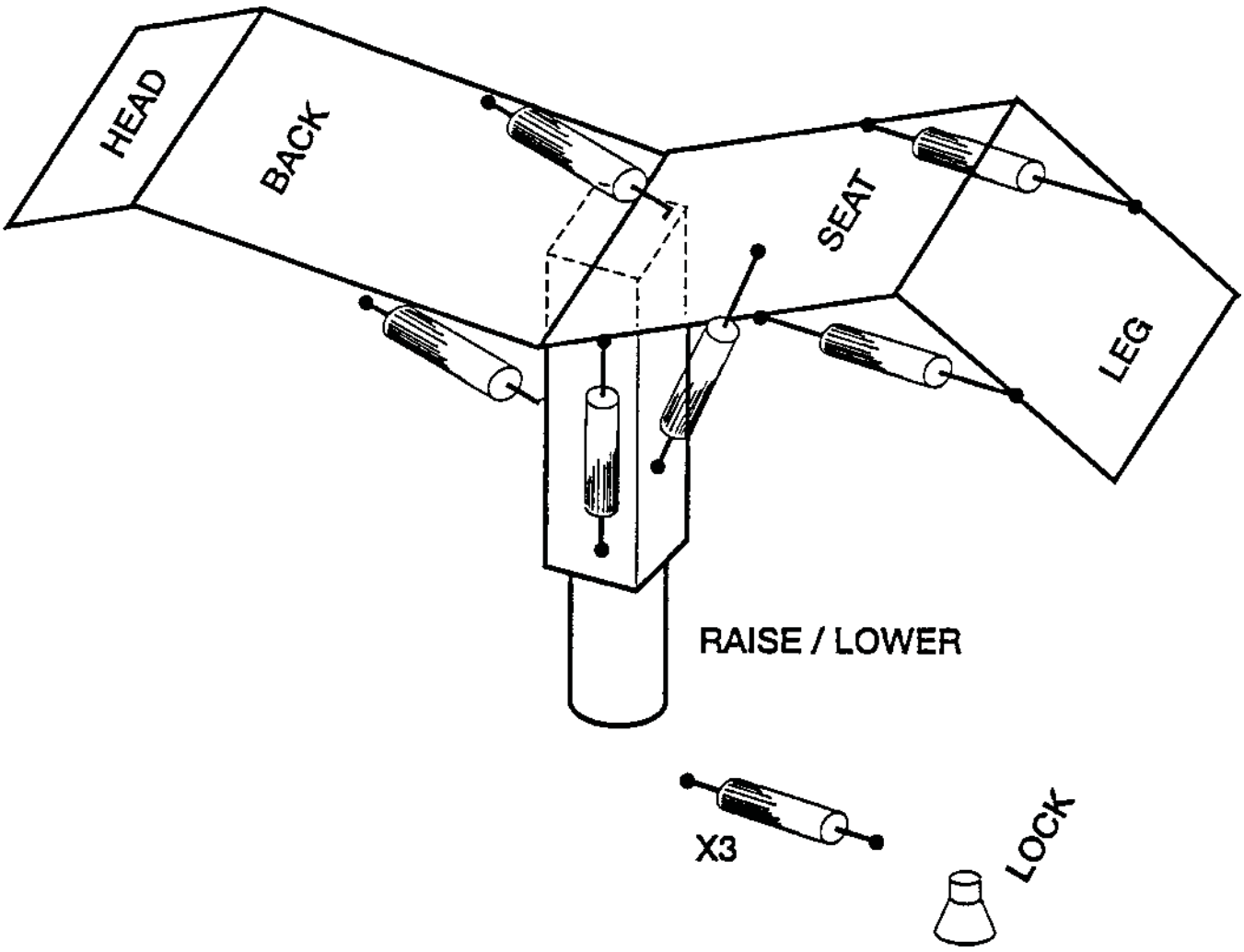
2. Actuate Return to Level. Tilt, back and seat must return to within 2 degrees of horizontal, and the leg section must return to within 2 degrees of the seat section.
3. Position the table top such that the following positions are at least 10 degrees from level:

right tilt	seat down
back down	leg up

4. Repeat paragraph 2.

IMPORTANT:

1. Table positioning will alternate on 1 to 1.8 second intervals until the top returns to level.
2. Refer to Section 8 for adjustment procedure.



Hydraulic Cylinder Locations

PRINCIPLES OF OPERATION

6.1 GENERAL VALVE INFORMATION

There are 11 two-position, three-way hydraulic cartridge valves (S1 thru S9, S16 and S17). When de-energized, the hydraulic-supply port is closed and the return-to-sump port is open to a particular hydraulic cylinder or valve. When energized, the return port is closed and the supply port is open to a particular hydraulic cylinder or valve.

There are six two-position, two-way hydraulic cartridge valves (S10 thru S15). When de-energized, the cartridge acts as a check valve. When energized, the valve acts as an open path for fluid.

All valves-in-fittings (check valves and flow-restrictors) are located adjacent to blue solenoid manifolds A & B.

The pilot check valves located in back, seat and leg section cylinders are not replaceable in the field. The entire cylinder must be replaced.

6.2 HYDRAULIC SYSTEM DESCRIPTION

Note: *Refer to Hydraulic System Schematic at the end of this section for the following discussion.*

The Quantum 3080 table is powered by an electro-hydraulic system utilizing a series of valves and cylinders to quietly and effectively operate the table. A special, high-efficiency gear pump is driven by a 24 VDC motor. The pump is rated at 0.25 gallons per minute and has a 1820 psi capacity. The system pressure is reduced to 1425 ± 25 psi through an external pressure-control valve. Solenoid actuated cartridge valves (Figures 6-1, 6-2, and 6-3) direct fluid to steel hydraulic cylinders.

Fluid is conducted through either

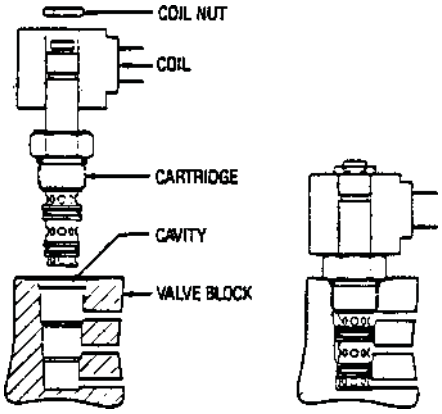


Figure 6-1. Cartridge Valve Concept

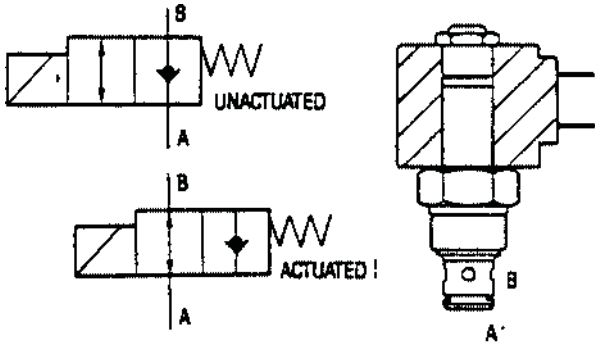


Figure 6-2. 2P2W Poppet Valve

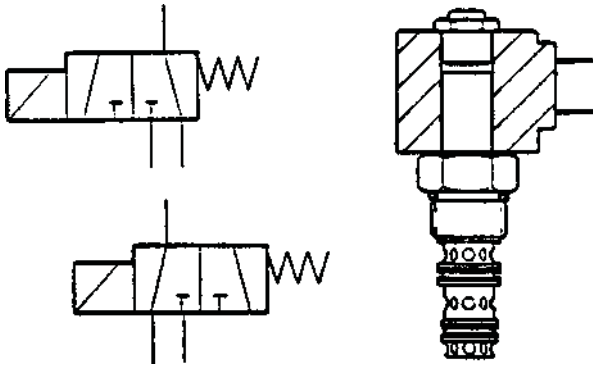


Figure 6-3. 2P3W Spool Valve

flexible, thermoplastic hoses, offering low resistance and maximum cleanliness, or through steel tubes. All hose, tube and port connections are SAE fittings or face seals (Figure 6-4), sealed with O-rings to provide maximum protection against leaks. Pilot-operated check valves (Figure 6-5) are built into the leg, seat and back section hydraulic cylinders (Figure 6-6) and are externally mounted to the tilt cylinder and raise/lower column. Flow-control restrictor and check valves (Figures 6-7 thru 6-11) are made integral parts of various tube and hose connectors to unclutter the hydraulic circuits. Flow fuses (Figure 6-12) are located in one of the leg and back hydraulic cylinders to stop section articulation if a failure in the delivery system is detected.

Three main filters (two 500-micron in reservoir, and one-10-micron in line) plus various small "last-chance" filters (104-micron) are located within the system at the inlet and outlet of most hydraulic cylinders to maintain oil cleanliness. A manual foot-operated pump (Figure 6-13) is provided for table operation in case of primary control failure (in such a case solenoid valves are operated by the 24 VDC power back-up battery).

All port connections are "SAE O-ring boss" and all hose and tube connections are "O-ring face seal".

Note: *Exceptions are the hydraulic pump fittings which are metric and the 4 to 5 cavity valve connections (LEN2).*

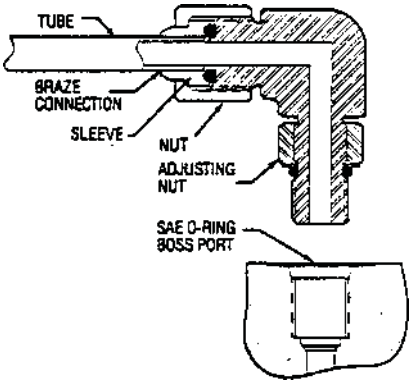


Figure 6-4. Tube Connections

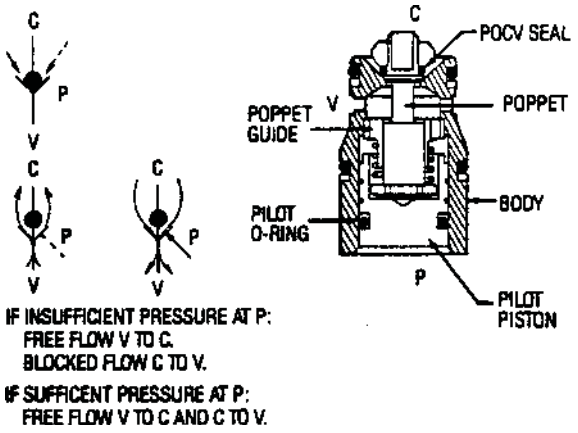


Figure 6-5. Pilot Operated Check Valve

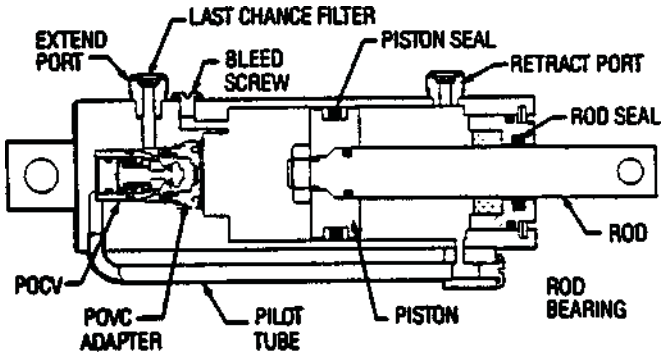


Figure 6-6. Typical Hydraulic Cylinder

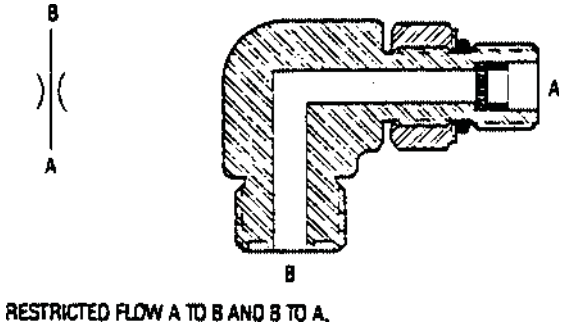


Figure 6-7. Restrictor Valve

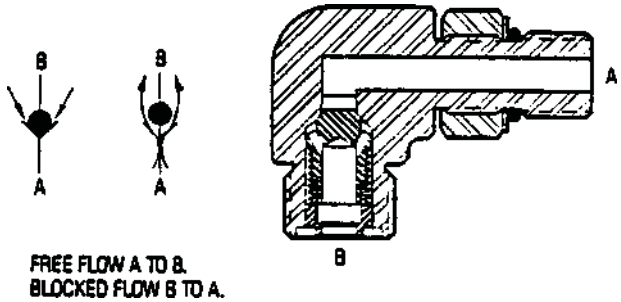


Figure 6-8. Check Valve

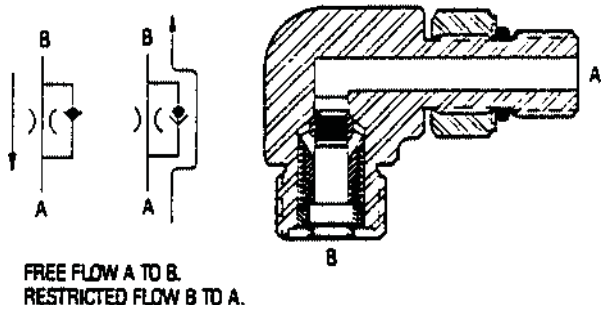


Figure 6-9. Flow Control Valve

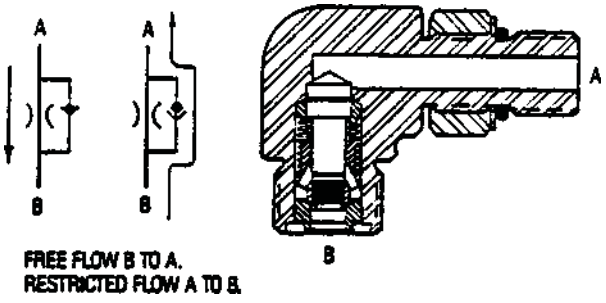


Figure 6-10. Flow Control Valve

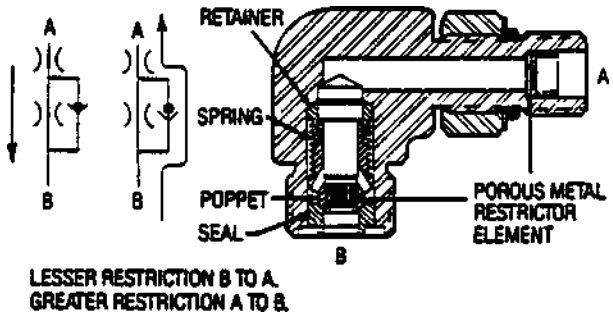


Figure 6-11. Bi-Flow Restrictor Valve

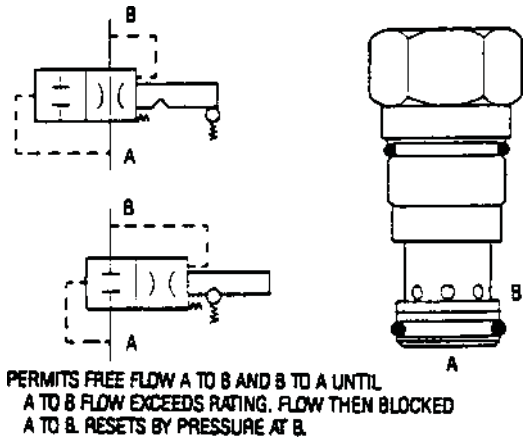


Figure 6-12. Flow Fuse

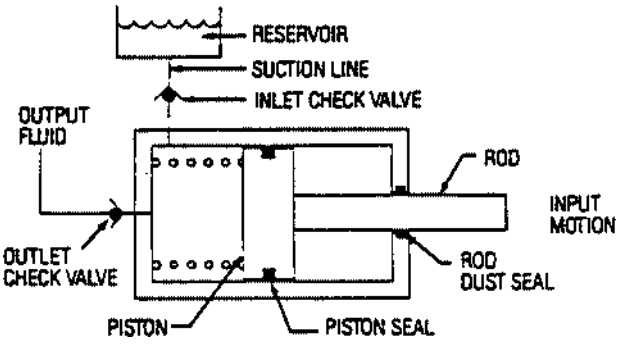


Figure 6-13. Manual Pump Operating Principle

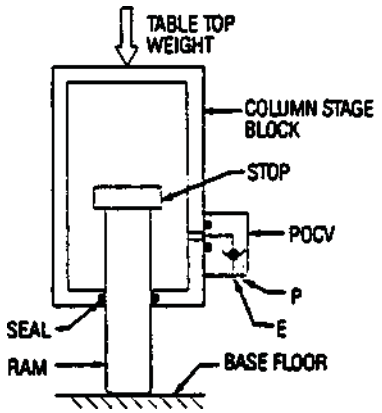


Figure 6-14. Column Ram

Figure 6-15. Locking Tilt Schematic

6.3 CYLINDER/SOLENOID ACTUATION

Raise/Lower (Figure 6-14)

The tabletop is raised when solenoid S9 is energized. There is no speed control for this function. The pilot check valve located on the side of the column allows flow to raise the tabletop.

The tabletop is lowered when S1 is energized, opening the pilot check valve on the side of the column. Lowering speed is controlled by a restrictor at port A2. An internally located restrictor, shunted around the S1 valve, dampens the closing of the pilot check valve by bleeding hydraulic pressure to sump when the valve is de-energized.

- **Tilt** (Figure 6-15)

The tilt function is accomplished by one hydraulic cylinder with a double pilot check valve arrangement. For left tilt, S7 is energized, diverting hydraulic fluid through a restrictor for speed control. Fluid enters the retract port of the cylinder and simultaneously opens the retract pilot check permitting flow out the extend port and on through the S2 valve. For right tilt, the same sequence is followed except S2 is energized and the cylinder extends. The cylinder has a mechanical lock system to assure the cylinder is full of fluid before the mechanical lock is hydraulically unlocked.

- **Back Up/Down** (Figures 6-16 and 6-17)

The back section is driven by two hydraulic cylinders connected in parallel. One cylinder (L4) contains the pilot check valve and the other (L3) a flow fuse. Both are used for section articulation.

To extend the back up, S5 and S10 solenoids are energized. Hydraulic fluid is diverted through S5, speed-control restrictor at A3 port, de-energized S15 valve seen as a check valve, and the pilot check valve on the L4 cylinder to the extend ports of both L4 and L3 which causes the cylinders to extend. The return lines of L3 and L4 return fluid to sump through the energized S10 and the normally open port of S4.

To retract the back down, S4 and S15 solenoids are energized. Fluid is diverted through S4, speed-control restrictor at A4 and the deenergized S10 valve seen as a check valve to the retract port of L3 and both the retract and pilot ports of L4. The return fluid is diverted from L3 and L4 through the now open pilot check valve, S15, and the normally open port of S4.

- **Flex/Reflex** (Figures 6-18 and 6-19)

To flex the tabletop, two back cylinders and the seat cylinder are connected in series to produce a coordinated movement.

For flex, S4 and S14 solenoids are energized. Hydraulic fluid is diverted through S4, the speed-control restrictor at A4 port, and deenergized S10 seen as a check valve to the retract ports of back-section cylinders L3 and L4. The return fluid from L3 and L4 is forced through S14 and deenergized S13 valve seen as a check valve, to the retract and pilot ports of the seat section (L5), retracting the cylinder. This action causes the tabletop to flex. The return fluid from L5 to sump is diverted through the normally open port of S6.

For reflex, S6, S10 and S13 solenoids are energized. Hydraulic fluid is diverted through S6, the speed-control restrictor at A5 port, and the pilot check valve on L5 to extend the cylinder and raise the seat section. Return fluid travels through S13 and the deenergized S14 valve seen as a check valve to the extend ports of the L4 and L3 cylinders to raise the back section. This action causes the table to reflex. The return fluid travels back to sump through S10 and the normally open port of S4.

- **Trendelenburg/Reverse Trendelenburg** (Figures 6-20 and 6-21)

For Trendelenburg articulation, the back and the seat section cylinders are connected in series to provide coordinated movement.

To articulate the unit in Trendelenburg, S6, S12 and S15 are energized. Hydraulic fluid is diverted through S6, the speed-control restrictor at A5 port, and the L5 pilot check valve, extending the seat-section cylinder to raise the section. The return fluid travels through S12 and the deenergized S11 valve seen as a check valve to the retract port of cylinders L3 and L4, causing the back section to go down. The return fluid from L3 and L4 travels through S15 and S5 back to sump. The action of these two sections produces Trendelenburg.

To articulate the tabletop in Reverse Trendelenburg, S5 and S11 are energized. Hydraulic fluid is diverted through S5, the speed-control restrictor at A3 port, deenergized S15 seen as a check valve, and the L4 pilot check valve to extend the back section. The return fluid from the back section cylinder travels through S11 and the deenergized S12 valve seen as a check valve to the pilot check valve on the seat-section cylinder, retracting it and causing the seat section to go down. This action produces Reverse Trendelenburg. The return fluid from the seat-section cylinder travels through the normally open S6 back to sump.

- **Leg Up/Down** (Figures 22 and 23)

The leg section is driven by two hydraulic cylinders connected in parallel. One cylinder contains a pilot check valve and the other a flow fuse. Both are used for section articulation.

To articulate the leg section upward, S3 solenoid is energized. Hydraulic fluid is diverted through S3 and a speed-control restrictor at B3. The fluid opens a pilot check valve and extends the L6 and L7 cylinders, raising the leg section up. The return fluid is diverted through the normally open S8 and then back to sump.

To articulate the leg section down, S8 solenoid is energized. Hydraulic fluid is diverted through S8 and the speed-control restrictor at B4 port. The fluid enters the retract port and opens the pilot check valve of L7 and lowers the

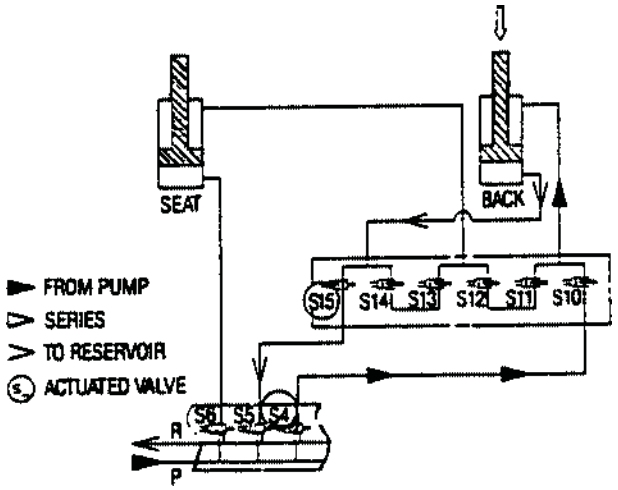


Figure 6-16. Back Down Schematic

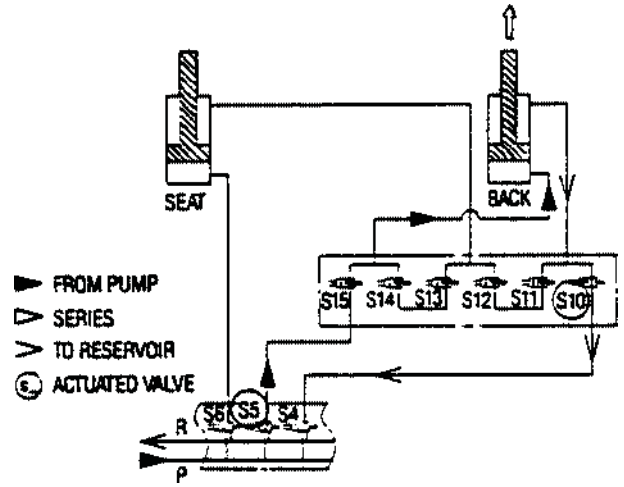


Figure 6-17. Back Up Schematic

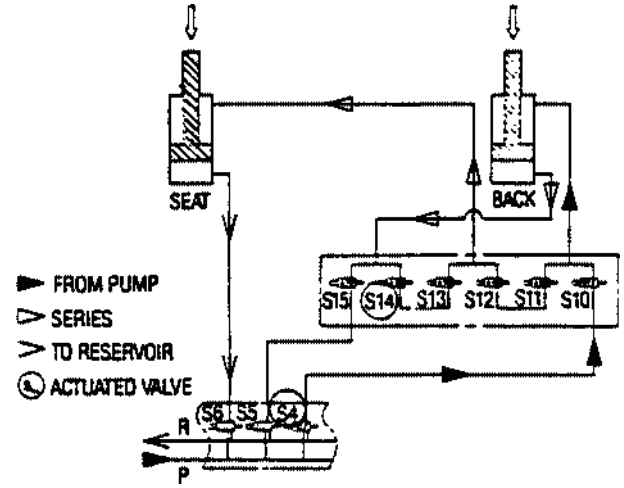


Figure 6-18. Flex Schematic

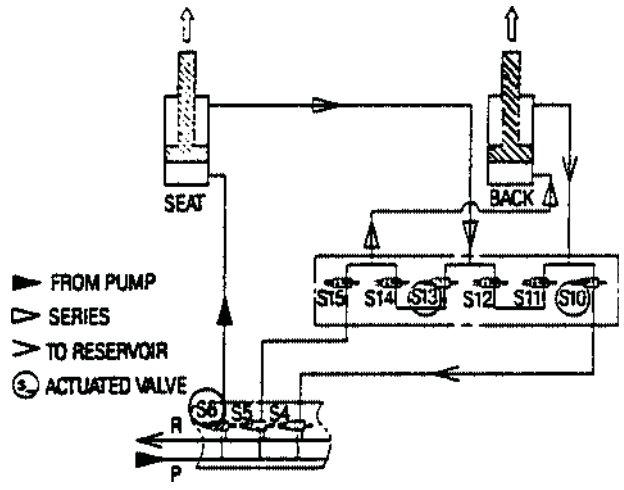


Figure 6-19. Reflex Schematic

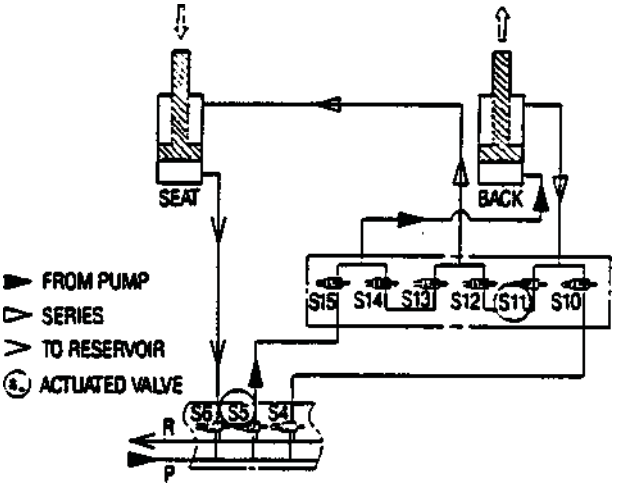


Figure 6-20. Reverse Trendelenburg Schematic

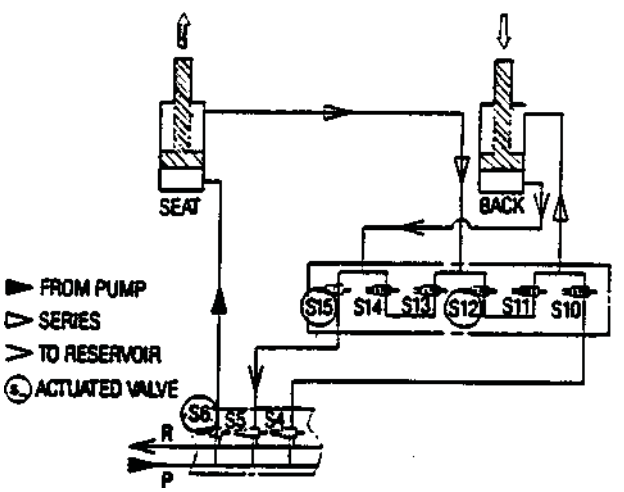


Figure 6-21. Trendelenburg Schematic

leg section. The return fluid is diverted through the speed-control restrictor at B3 port, the normally open port of S3 and back to sump.

- **Floor Lock** (Figures 24 and 25)

The table has three locking legs driven, through a mechanical over-center lock mechanism, by cylinders L8, L9 and L10. All the cylinders are connected in parallel.

To extend the floor locks, solenoid valve S17 is energized and hydraulic fluid is diverted through it. The speed of cylinder travel is controlled by a restrictor valve in the extend port on each cylinder. Return fluid is diverted back to sump through the normally open S16 valve.

To retract the floor locks, solenoid valve S16 is energized. Hydraulic fluid is diverted through S16 to retract the cylinder. Return fluid is diverted, through the speed-control restrictor valve, through the normally open port of S17 and then to sump.

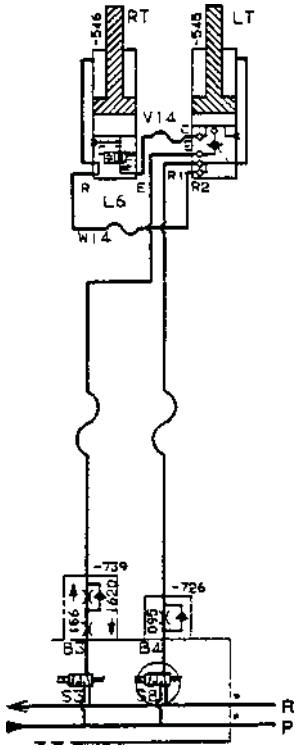


Figure 6-23. Leg Down Schematic

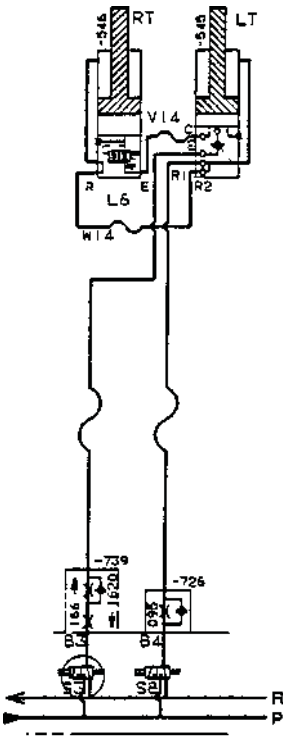


Figure 6-22. Leg Up Schematic

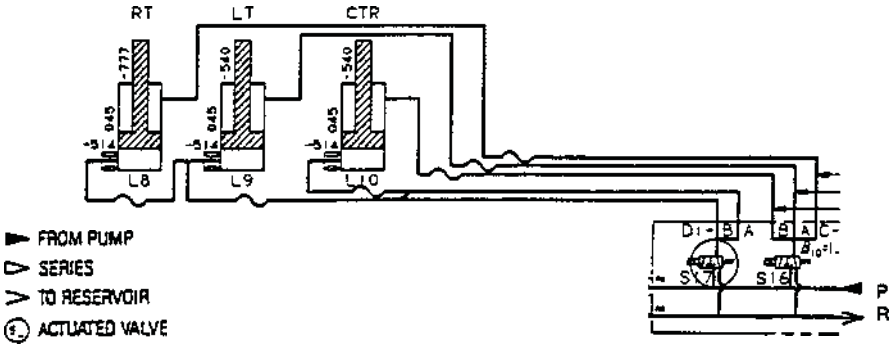


Figure 6-24. Floor Locks Extended Schematic

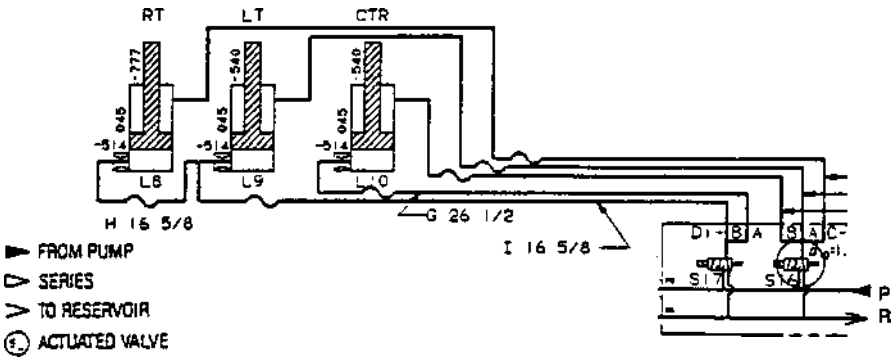


Figure 6-25. Floor Locks Retracted Schematic

6.4 TROUBLESHOOTING

The Troubleshooting Chart (Table 6-1) provides an easy-to-use sequence of steps that should identify and correct most problems encountered in hydraulic system operation. A working knowledge of the hydraulic schematics is essential to understand how the appropriate remedy may or may not correct the problem (see Figure 6-15 thru 6-21 and the System Schematic in Section 6.3).

Refer to Section 7, Electrical system, when the cause of the problem appears to be electrical. Use Table 7-1, Electrical Troubleshooting chart, in conjunction with Table 6-1 when applicable. The troubleshooting charts are separated because of the need to understand system operation and because, in most cases, problems will be either hydraulic or electrical, not both.

TABLE 6-1. HYDRAULIC SYSTEM TROUBLESHOOTING

Problem	Symptom/Cause	Remedy	Where to Find
1. Table will not operate.	1. Hydraulic pump does not come on.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Pump runs but does not provide power to system.	1) Check hydraulic fluid level. Add fluid if necessary. 2) Install pressure gauge at test point. Operate manual pump. Pressure gauge should read 1425 ± 25 psi. 3) If pressure is not right, adjust relief valve. 4) If pressure is right, use manual pump and attempt to operate individual functions. 5) If functions operate, proceed to Symptom 3. 6) If an individual function does not operate, proceed to appropriate problem	Sec. 8.11 Sec. 5-3: Fig. 9.5
	3. Table operates with manual pump but not with electric pump.	1) Be sure electric pump is operating. Refer to Table 7-1, Electrical Troubleshooting if necessary. 2) Turn pump on and observe pressure on gauge at test port. If pressure is not 1425 ± 25 psi, adjust relief valve. 3) If pressure cannot be adjusted to this level, replace pump or relief valve. 4) If pressure can be adjusted, operate functions one at time. Proceed to appropriate problem if an individual function does not operate.	Sec. 5.3; Fig. 9.5
2. Table functions operate, but they are too slow.	1. Hydraulic pressure low.	1) Install pressure gauge at test port. 2) Using manual pump, pressure should read 1425 ± 25 psi. Adjust relief valve. 3) check for kniks in hoses or damaged tubing, correct as necessary. 4) Follow pump troubleshooting procedures (Problem 1, Symptom 3).	Sec. 5.3; Fig. 9.5
3. Floor locks do not operate.	1. Floor lock solenoid coils do not energize.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Mechanical binding of mechanism.	1) Floor locks out of adjustment. 2) Floor locks shaft/bearing dirty-corroded. 3) Floor lock housing loose.	Sec. 5.6 Fig. 9-4, Item 13/24 Fig. 9-4, Item 25

TABLE 6-1. HYDRAULIC SYSTEM TROUBLESHOOTING (continued)

Problem	Symptom/Cause	Remedy	Where to Find
3. Floor locks do not operate (continued).	3. Solenoid S17 (LOCK) or S16 (UNLOCK) does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8-3; Fig. 9.5
	4. One or more of the hydraulic cylinders (L8, L9, L10) is defective or binding.	1) Replace defective hydraulic cylinder(s). 2) Determine source of binding - repair or replace.	Sec. 8.1.1, 8.1.2, 8.1.3; Fig 9.4
4. Tabletop Raise/Lower a. Tabletop will not raise.	1. Solenoid S9 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting	
	2. Solenoid valve S9 does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
	3. Hydraulic pressure low.	1) Adjust pressure.	Sec. 5.3
	4. Raise/Lower mechanism binding.	1) Adjust mechanism movement.	Sec. 8.10
b. Tabletop will not lower.	1. Raise/Lower mechanism binding.	1) Adjust mechanism movement.	Sec. 8.10
	2. Solenoid S1 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	3. Solenoid valve S1 does not actuate when energized.	1) Valve cartridge defective - replace. 2) solenoid coil defective - replace.	Sec. 8.3
	4. Pilot check valve does not open.	1) Valve defective - replace. 2) Adjust hydraulic pressure.	Sec. 8.3 Sec. 5.3
	5. Lower bleed restrictor at A2 not working properly.	1) Replace the restrictor.	Fig. 9.22
c. Tabletop drifts down when in raised position.	1. Pilot check valve is leaking internally.	1) Pilot check valve defective - replace.	Sec. 8.3
	2. Raise/Lower cylinder L1 is defective.	1) Call Erie Field Engineering.	

TABLE 6-1. HYDRAULIC SYSTEM TROUBLESHOOTING (continued)			
Problem	Symptom/Cause	Remedy	Where to Find
5. Tabletop Tilt a. Tabletop tilt will not operate.	1. Solenoid S7 (tilt left) or S2 (tilt right) is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S7 (tilt left) or S2 (tilt right) does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
	3. Hydraulic pressure low.	1) Adjust pressure.	Sec. 5.3
b. Tilt function drifts.	1. Locking tilt cylinder defective.	1) Replace tilt cylinder.	
6. Tabletop Back Section a. Back section will not raise.	1. Solenoid valve S5 or S10 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting	
	2. Solenoid valve S5 or S10 does not actuate when energized.	1) Valve cartridge defective - replace. 2) solenoid coil defective - replace.	Sec 8.3
b. Back section wil not lower.	1. Solenoid valve S4 or S15 does not actuate when energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S4 or S15 does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
	3. Pilot check valve in L4 not opening.	1) Replace L4 hydraulic cylinder.	Sec. 8.8.4
c. Back section drifts down.	1. Pilot check valve in L4 is leaking.	1) Replace L4 hydraulic cylinder.	Sec. 8.8.4
	2. Cylinder L3 or L4 is defective.	1) Replace hydraulic cylinder.	Sec. 8.8.4
7. Tabletop Flex a. Tabletop will not flex or reflex.	1. Back section does not articulate.	1) Refer to Problem 6.	

TABLE 6-1. HYDRAULIC SYSTEM TROUBLESHOOTING (continued)

Problem	Symptom/Cause	Remedy	Where to Find
7. Tabletop Flex (cont'd) b. Tabletop will not flex.	1. Solenoid valve S4 or S14 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S4 or S14 does not actuate when energized	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec 8.3
	3. Pilot check valve in L4 or L5 not opening.	1) Valve defective - replace.	Sec. 8.3
c. Tabletop will not reflex.	1. Solenoid valve S6 or S10 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S6 or S10 does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
d. Back section drifts down.	1. Back section is not operating properly.	1) Refer to Problem 6-c.	
e. Seat section drifts down.	1. Pilot check valve in L5 leaking internally.	1) Replace defective hydraulic cylinder.	Sec. 8.8.6
	2. Cylinder L5 is defective.	1) Replace defective hydraulic cylinder.	Sec. 8.8.7
8. Tabletop Leg Section a. Leg section will not raise	1. Solenoid valve S3 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S3 does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
	3. Pilot check valve in L7 is stuck closed.	1) Hydraulic cylinder defective - replace.	Sec. 8.8.5
b. Leg section will not lower.	1. Solenoid valve S8 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	2. Solenoid valve S8 does not actuate when energized.	1) Valve cartridge defective - replace. 2) Solenoid coil defective - replace.	Sec. 8.3
	3. Pilot check valve in L7 is stuck closed.	1) Hydraulic cylinder defective - replace.	Sec. 8.8.5

TABLE 6-1. HYDRAULIC SYSTEM TROUBLESHOOTING (continued)			
Problem	Symptom/Cause	Remedy	Where to Find
8. Tabletop Leg Section (cont'd) c. Leg section drifts down.	1. Pilot check valve in L4 is leaking internally.	1) Hydraulic cylinder defective - replace.	Sec. 8.8.5
	2. Cylinders L6 or L7 defective.	1) Hydraulic cylinder defective - replace.	Sec. 8.8.5
9. Tabletop Trendelenburg does not function.	1. Tabletop Flex/Reflex does not operate.	1) Refer to Problem 7.	
	2. Solenoid valve S6, S12, or S15 is not being electrically energized.	1) Refer to Table 7-1, Electrical Troubleshooting.	
	3. Solenoid valve S6, S12, or S15 does not actuate when energized.	1) Valve cartridge(s) defective - replace. 2) solenoid coil defective - replace.	Sec. 8.3
10. Tabletop Reverse Trendelenburg does not function.	1. Tabletop Flex/Reflex does not operate.	1) Refer to Problem 7.	
	2. Solenoid S5 or S11 is not being electrically energized.	1) Refer to Table 7-1, Electrical Schematics.	
	3. Solenoid S5 or S11 does not actuate when energized.	1) Replace defective valve cartridge. 2) Solenoid coil defective - replace.	Sec. 8.3
11. Manual Pump a. Loses prime/leaks.	1.Oil leakage around stem.	1) Replace the pump assembly.	Fig. 9.7
	2. Check valve leaking/stuck closed.	1) Replace the check valve.	Fig. 9.7